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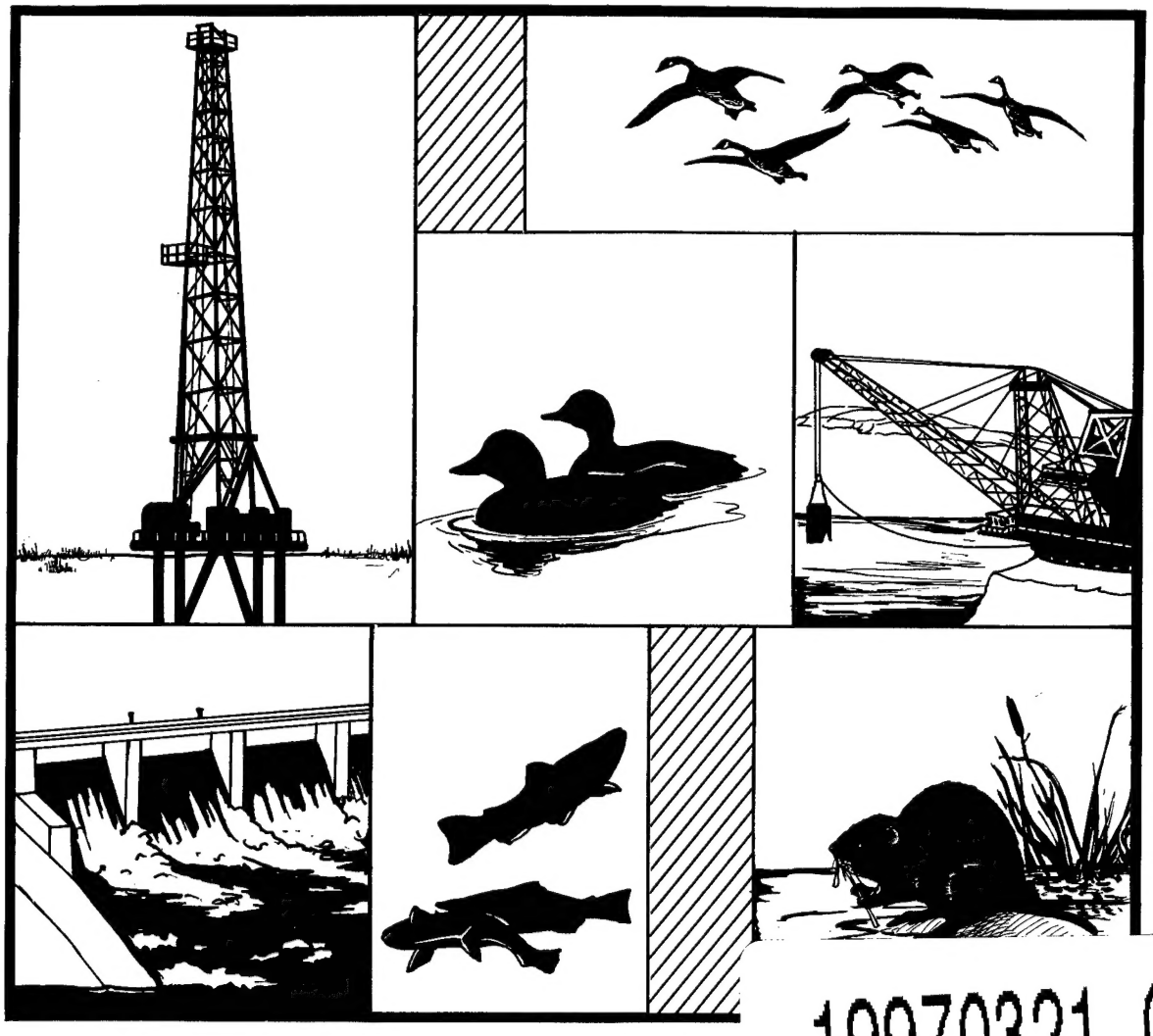

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MITIGATION BANKING

by

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SUMMARY

The concept of mitigation for adverse impacts on fish and wildlife resources is fairly recent and is supported by legislation that requires "equal consideration" of fish and wildlife conservation with other aspects of Federal water resource development projects. Since the early 1980's, mitigation banking has been considered as one of the tools available to the U.S. Fish and Wildlife Service to achieve compensation for unavoidable project-related resource losses.

Mitigation banking has been likened to maintaining a bank account. A developer implements measures to create, improve, or preserve fish and wildlife habitat prior to an anticipated need for mitigation for project impacts. The benefits of these measures are quantified as mitigation credits for the developer and placed in a mitigation bank account from which withdrawals can be made. When the developer proposes a project which will result in unavoidable losses of fish and wildlife resources, the losses are quantified as debits using the same method that was used to determine bank credits. A withdrawal equal to that amount is deducted from the bank balance. The debiting process can be repeated as long as mitigation credits are available in the bank. Mitigation banking, by definition, is intended to involve only those habitat measures taken expressly to compensate for habitat losses associated with future development actions.

The U.S. Fish and Wildlife Service has been involved in 13 implemented mitigation banks since the early 1980's, with several more currently at various stages of planning and negotiation. All but one of the implemented banks were developed in response to mitigation requirements associated with the Section 10 (Rivers and Harbors Act) and Section 404 (Clean Water Act) permitting process. The two most prevalent types of projects for which banks have been used are highways and port development, with five banks each. The remaining three banks involve oil and gas exploration and industrial development, both permit and license activities, and a Federal Bureau of Reclamation water development project. Ten of the 13 banks have involved a fixed area of land, ranging from 11 acres to 9,523 acres, while the other three banks have no limit to the size of the bank and contain provisions for establishing additional credits on a project-by-project basis, usually with the concurrence of the parties to the banking agreement. Use of credits to date varies from banks with no remaining credits to banks that are so new that the activities required to establish credits have not yet occurred.

Although some of the 13 banks have not yet been implemented long enough to evaluate effectiveness, experience with the majority is sufficient to compare actual banking activities with expected advantages and disadvantages and to develop recommendations designed to contribute to successful mitigation bank implementation in the future. Mitigation banking is being used with some success, particularly on the West Coast and in the Southeast. Although banking appears to have a definite place in mitigation activities, the concept must be very judiciously applied.

Mitigation banking has different applicability to different areas and different types of projects. However, banks can be a viable option when they are structured and administered carefully and other mitigation possibilities are limited or nonexistent. Banks have their greatest potential application where no mitigation would otherwise occur, such as where several small projects are involved that would otherwise be difficult or impossible to mitigate on an individual basis or where there is no possibility for onsite mitigation and the applicant will support offsite mitigation.

CONTENTS

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INTRODUCTION

The concept of mitigating for adverse impacts on fish and wildlife resources is fairly recent and is supported by legislation that requires "equal consideration" of fish and wildlife with other aspects of Federal water resources development projects. The broad definition of mitigation developed by the Council on Environmental Quality (CEQ; 40 CFR Part 1508.20) also includes the desirable steps in a mitigation planning process: avoidance, minimization, rectification, reduction or elimination over time, and compensation for project-induced impacts.

Since the early 1980's, mitigation banking has been considered as one of the tools available to the U.S. Fish and Wildlife Service (FWS) to meet the last category in CEQ's mitigation definition: achieving compensation for unavoidable project-related resource losses. Mitigation banking has been defined as "...habitat protection or improvement actions taken expressly for the purpose of compensating for unavoidable, necessary losses from specific future development actions" (U.S. Fish and Wildlife Service 1981, 1983). In simpler terms (Soileau et al. 1985):

> "...mitigation banking is similar to maintaining a bank account. A developer undertakes measures to create, restore, or preserve fish and wildlife habitat in advance of an anticipated need for mitigation for project construction impacts. The benefits attributable to these measures are quantifed, and the developer receives mitigation credits from the appropriate regulatory and/or planning agencies. These credits are placed in a mitigation bank account from which withdrawals can be made. When the developer proposes a project involving unavoidable losses of fish and wildlife resources, the losses (debits) are quantified using the same method that was used to determine credits, and a withdrawal equal to that amount is deducted (debited) from the bank. This can be repeated as long as mitigation credits remain available in the bank."

This report presents the results of an evaluation designed to: (1) compile a current inventory of implemented mitigation banks with FWS involvement; and (2) based on an analysis of those banks and other input, provide guidance for use in developing and implementing mitigation banking proposals. The report consists of three parts: a discussion of the concept and process of mitigation banking, a description of the legislative and policy background, and an overview of mitigation banks with FWS involvement.

MITIGATION BANKING PROCESS

THE CONCEPT

The concept of mitigation banking was developed in response to a number of requests to consider "banking" of management credits for future use in mitigating fish and wildlife losses. It was thought that, properly implemented, mitigation banking could be an innovative mechanism to obtain compensation for unavoidable habitat losses primarily associated with wetland resource development projects regulated under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Stated objectives for mitigation banking included: (1) to ensure adequate compensation for fish and wildlife habitat losses; and (2) to the degree appropriate, reduce the processing time for Federal permits associated with Section 10/404 permits. Mitigation banking, by definition, is intended to involve only those habitat protection, creation, or improvement measures taken expressly to compensate for habitat losses associated with future development actions.

ADVANTAGES AND DISADVANTAGES

Conceptually, mitigation banks are designed to provide permit applicants and permitting agencies with a simpler, more effective process for complying with mitigation requirements, thus improving the resource value of mitigation projects (Riddle 1986). As such, mitigation banks present a number of potential advantages and disadvantages over more traditional approaches.

Advantages

Consolidation of mitigation for small wetland losses. Some of the most significant wetland losses are those resulting from numerous small, piecemeal decisions (Niedzialkowski and Jaksch 1986). The cumulative effect has been significant conversions of wetlands without a major decision and without ever addressing the issue directly. Establishment of a mitigation bank to satisfy the mitigation needs of a number of projects that are small in terms of impacted area can provide a larger, more environmentally valuable area that is more efficient and more economical to develop and manage than are several scattered sites.

Mitigation projects for small losses that would ordinarily be carried out on a piecemeal basis by a number of different permit applicants can be consolidated into a single mitigation bank (Riddle 1986). Successful mitigation for very limited habitat losses can be difficult. Even when developers are able to locate mitigation sites, the sites may be costly and impractical in terms of desirable mitigation actions and may have limited habitat value if they are small and isolated.

There can be economies of scale and increased management options when mitigation projects involve large blocks of habitat (U.S. Fish and Wildlife Service 1987). The result may be more benefit in terms of wetland values per dollar spent than is possible when smaller areas are involved. In some cases, a mitigation bank may provide an opportunity to consolidate financial and management resources of a number of different entities, thus supporting mitigation projects that would not be feasible for a single permit applicant.

In addition to allowing more cost-effective and efficient mitigation because of the larger area involved, mitigation banks may result in mitigation for very small individual projects that would not otherwise be mitigated. It often is difficult to justify the significant time needed to adequately design, plan, monitor, and evaluate a number of small offsite mitigation projects, especially with constraints of limited personnel and funding (Good 1987).

In some areas, mitigation banks may provide a better option for habitat compensation than requiring individual mitigation projects (Riddle 1986). It often is difficult for developers whose projects will impact only small areas to find, acquire, and enhance areas to replace lost wetland values. In addition, the utility of creating a number of small, disconnected wetlands may be questionable, especially in areas where local or regional goals involve the creation or restoration of large contiguous wetland areas with a diversity of fish and wildlife habitats (Good 1987).

Mitigation in advance. Mitigation banks, where credits are established in advance of project impacts, can eliminate the lag time between losses of fish and wildlife habitat at the development site and compensation for those losses (Riddle 1986). Successful wetland creation or restoration efforts typically take several years to become fully functioning wetlands. Theoretically at least, bank credits against which project impacts can be debited are not established until wetland values are present. This is a far different situation from the mitigation requirements generally imposed by permitting agencies, which call, at best, for concurrent initiation of the mitigation and development projects. When wetland creation or restoration efforts are initiated at the same time as the development project, there can be a considerable period of time during which habitat has been lost and the replacement habitat is not fully functional.

Increased planning effort. Mitigation banking can increase predictability and success of compensation when mitigation actions are initiated prior to project development, rather than during or after project construction (U.S. Fish and Wildlife Service 1987). Negotiating and establishing mitigation in advance of project proposals can have a number of advantages. First, it provides the opportunity to design and implement mitigation activities in a timeframe that is not dictated by the deadlines of a pending development project (Riddle 1986). When mitigation activities are planned in advance of project-specific mitigation needs, the lead time necessary for thorough, ecologically sensitive planning and design is available (Good 1987).

Mitigation banks generally involve more planning than is possible when formulating mitigation plans for individual permits, especially if the projects have limited impacts. In addition, bank planning can be integrated into

larger, even regional, environmental planning efforts, so that goals and methods used for mitigating wetland losses are consistent with overall wetland preservation objectives (Kerr and Associates, Inc. 1987). Piecemeal efforts, especially if they involve small areas, are not as likely to offer this opportunity. In some cases, initiation of a bank planning effort may stimulate the development of long-term local or regional goals for wetland protection, enhancement, and creation.

Conflict resolution. One of the advantages of mitigation banking is that it puts mitigation up front in the planning process (Brown 1986). Design and implementation of a bank requires considerable cooperation among involved agencies. Because mitigation is an early planning measure when banks are being considered, developer-regulator-commentor conflicts should be minimized, which can reduce expenditures of time and money typically associated with permit applications (Niedzialkowski and Jaksch 1986).

In order to effectively reduce or resolve conflicts, mitigation banking needs to be part of an integrated planning system that involves all of the appropriate local, State, and Federal agencies and private parties. Banking, in such situations, can help minimize the time and money spent by developers in planning projects that subsequently require modification to mitigate impacts. Banks also can provide a mechanism whereby resolution of issues can be achieved prior to the time constraints of the permit review process (U.S. Fish and Wildlife Service 1983). Banking proposals often encourage comprehensive planning efforts and, as a result, may receive closer scrutiny than conventional mitigation plans (Niedzialkowski and Jaksch 1986).

Monitoring and evaluation. One of the biggest problems associated with permits that are conditioned with mitigation requirements has been lack of resources to monitor and evaluate the mitigation actions or, in many cases, to determine if they were ever implemented. Permitting and other involved agencies typically lack adequate staff to monitor compliance and, as a result, permit applicants often fail to implement mitigation requirements (Riddle 1986). Monitoring and evaluation of mitigation compliance and success are easier and more efficient with fewer, larger sites, such as mitigation banks (Good 1987).

Noncompliance with mitigation requirements is a weak link in the Section 10/404 permit process (Niedzialkowski and Jaksch 1986). Mitigation banking can provide an opportunity to revisit the site to determine the success of the mitigation plan. The formal banking agreement can be used as a vehicle to ensure a commitment and establish responsibility for follow-up evaluation activities and adjustments in the bank management plan if the desired outcome is not being achieved.

Reduction in Federal permit processing time. Two goals were associated with the mitigation banking concept. One was to accomplish mitigation for wetland losses that would not otherwise be fully mitigated, such as small projects that could not be effectively mitigated on an individual basis but collectively represented a significant wetland loss. The second goal was to shorten the permit processing time, as appropriate. Developers are interested in reducing delays and related costs associated with the permit review process

(Niedzialkowski and Jaksch 1986). When banks are established, mitigation actions are approved and implemented before any permit actions occur. When a permit action is proposed that would be an appropriate potential debit against existing bank credits, the permit application can be more quickly reviewed in terms of mitigation recommendations and, if acceptable, approved. The possibility of shortening permit processing time is one of the main reasons developers have supported mitigation banking (Short 1987b).

Developers ideally initiate a mitigation bank before applying for individual permits for which banking would be applicable. Putting mitigation up front in the form of a bank helps developers plan more exactly for the level and cost of mitigation activities that will be associated with their projects (U.S. Fish and Wildlife Service 1987). Potentially, this means that mitigation requirements are less likely to be a hurdle to the issuance of a permit or to the project itself.

Banking can provide additional administrative flexibility to achieve mitigation for unavoidable habitat losses, especially where bank credits serve as a developer's bond or collateral to ensure compliance with required mitigation measures (U.S. Fish and Wildlife Service 1987). This type of arrangement also can be used to facilitate the permitting process.

Public recognition for wetland mitigation actions. Public recognition associated with establishing a mitigation bank, especially in areas with seriously declining wetland resources, can provide increased incentive for developers to participate in efforts to protect wetland resources that might otherwise be vulnerable (Niedzialkowski and Jaksch 1986).

Disadvantages

Although mitigation banking can provide opportunities for increased mitigation benefits and, where appropriate, a shortened permit review process, there are substantial risks. These risks need to be completely understood by all potential bank participants so they can be avoided or resolved during the planning process (U.S. Fish and Wildlife Service 1987).

Reduction in quality of project planning. A major risk associated with mitigation banking is the possibility that appropriate project planning will be neglected and that bank credits will be used before all means of avoiding or minimizing impacts are exhausted (Soileau et al. 1985). Mitigation banks were never intended to be used as a substitute for proper project planning (especially in the avoidance and minimization of adverse impacts and the possibility of onsite mitigation), as a mechanism to avoid compliance with Section 404(b)(1) guidelines, or as a means for the FWS to avoid being perceived as an obstructionist (Short 1987b). Some FWS Regions have been reluctant to become involved with mitigation banking because of their concern that involvement will be misconstrued as indicating that the FWS may be willing to forego the proper steps in project planning and mitigation. Within the FWS, criticism of mitigation banking is based on the belief that the only true mitigation is avoidance and the fact that it may take more time and effort to coordinate and implement a bank in some situations than it would be worth.

Certainly, banks that involve more than one developer may prove complicated and time-consuming, and long-term maintenance of bank sites generally is problematic.

Once a mitigation bank has been established, developers may perceive the bank as a mechanism to ensure blanket approval of future permit applications and, as such, a substitute for adequate project planning to avoid or reduce impacts to fish and wildlife resources. Mitigation banks also may be exploited by permit applicants to provide opportunities to pursue the relaxation of existing laws or regulations, to promote inappropriate development projects, or to avoid more complex and costly, but environmentally superior, mitigation requirements (Riddle and Denninger 1986).

Net loss in wetland habitat. Mitigation banks can focus on wetland creation, restoration, preservation, or enhancement, or some combination of these activities. Unless they involve wetland creation or restoration, which are not proven concepts in terms of the technical and management requirements for their successful implementation, banks represent a net loss in wetlands if they result in management (even if it is improved management) or preservation of one wetland to "compensate" for the loss of another wetland. Acquisition of existing offsite wetlands to compensate for wetland loss or damage is based on the premise that the acquired wetlands would have been destroyed otherwise. However, such activities still result in a net loss in wetlands. Even when banks involve wetland creation or restoration, existing knowledge is far from complete about the length of time necessary to establish a functioning wetland, the area needed to provide an equivalent of wetlands that will be lost, and whether or not all of the functions of an existing wetland can be duplicated in a restored or created wetland (Riddle 1986).

It frequently takes several years to determine success of a mitigation bank in meeting its design objectives. During that period, the bank may continue to be used to mitigate for habitat losses related to development projects. If the bank does not generate the anticipated credits, habitat losses associated with those debited projects are not fully compensated.

Offsite mitigation. There is no guarantee that all of the species lost at a project site will occur at a mitigation bank site, even with the best of management activities. Local people, as well as local populations of fish and wildlife, may not directly benefit from banks several miles from impacted wetlands. In highly developed areas, land available for offsite mitigation projects may be very limited in availability and high in cost. This can contribute to two problems: (1) mitigation banks that are located at a considerable distance from development projects; and (2) decreased availability of potential mitigation areas for other developers who are planning projects in the vicinity of the banks.

Mediating conflicts and reaching consensus. Mediating conflicts and reaching consensus on all of the attributes of a banking agreement are complex and time-consuming tasks (U.S. Fish and Wildlife Service 1987). Success requires a strong commitment from all involved parties to provide the necessary time, money, and other resources to complete the process. Areas where lack of agreement can delay or hinder implementation or use of a bank include the following:

1. Selection of an evaluation methodology for use in establishing bank credits and debits associated with development projects.

2. Comparisons of the bank and project areas to determine if "equivalent" habitat values are available within the bank habitat credits.

3. Obtaining a long-term commitment from the bank sponsor or other involved entity for the continued operation and maintenance of the bank throughout its dedicated life.

4. Where no impending important development project is present to act as a catalyst, agencies may be hesitant to participate in efforts to establish a bank.

5. Because habitat improvement measures are not always as successful as predicted in increasing habitat value, some agreement needs to be reached on a later adjustment in bank credits if necessary.

PROJECT APPLICABILITY FOR MITIGATION BANKING

Applicable Project Types

State and local public entities with recurring, similar development needs, such as highway agencies and port authorities, seem to be the most frequent candidates for development and use of mitigation banks. Mitigation banks also may be applicable to small Federal water projects (U.S. Fish and Wildlife Service 1983). Early coordination with the construction agency and the project sponsor is critical with Federal water projects because of the possible need for Congressional authorization and Department-level involvement.

The linear nature of highway development or reconstruction projects frequently makes onsite mitigation measures difficult to design and costly to implement (Laney et al. 1987). Small, scattered tracts of mitigation land may be more difficult to manage and have less fish and wildlife habitat value than larger, contiguous tracts.

The 1980's have been an era of unprecedented development and growth for most coastal cities (Riddle 1986). Major airport and port expansion projects and many smaller, less visible projects have resulted in the loss of significant amounts of fish and wildlife habitat. All concerned parties,

including developers who propose projects and regulatory agencies that issue permits, find that planning compensation for these coastal losses is difficult and complex.

Project Criteria

Utilization of an established mitigation bank should occur only after all attempts to avoid or minimize impacts and to provide onsite mitigation have been exhausted (Laney et al. 1987). The minimum requirements that a development project impacting wetland habitat should meet before debiting project impacts against mitigation bank credits is considered include the following (Soileau 1984):

1. Public benefit. There should be demonstrated public benefit associated with the project. Expected benefits to the public interest from the project should outweigh foreseeable detrimental impacts on fish and wildlife resources.

2. Water-dependency. The project should require access or proximity to, or siting in, the aquatic environment.

3. Least damaging alternative. There should be no practicable alternative locations or construction methods that would have less adverse consequences to wetlands while still allowing accomplishment of project objectives. Only projects that incorporate the least damaging alternative should be eligible to use bank credits.

4. Unavoidable impacts. All other avenues of impact avoidance and minimization should have been exhausted.

5. Onsite mitigation. Onsite mitigation means should be unavailable or insufficient to meet project mitigation needs.

IMPLEMENTATION PROCEDURES

Problems can, and almost inevitably will, occur when a mitigation bank is proposed. Before planning is initiated, the involved entities should thoroughly understand the potential problems and decide whether or not implementation of a bank makes sense. Creation of a mitigation bank involves a number of recommended steps (Kinser and Hansen, undated):

1. Identify the agency or agencies with which it seems appropriate to consider a mitigation bank and form an interagency team.

2. Identify an involved entity that is willing to develop the bank site prior to its use as mitigation for project impacts.

3. Identify the types of wetlands that need to be included in the bank, emphasizing in-kind mitigation requirements.

4. Identify potential bank sites.

5. Evaluate the potential bank sites and select the most suitable candidate sites.

6. Select the bank site and acquire the land.

7. Complete a detailed site development plan and identify responsible entities for bank development and long-term management.

8. Develop the bank site and determine available credits using the selected evaluation methodology.

9. Agree to the bank credit and debit procedures, including any restrictions on use of bank credits.

10. Use the bank, as appropriate, to mitigate for necessary and unavoidable project impacts.

Coordination

A number of agencies and concerned interest groups, each with its own goals, may be involved in planning a mitigation bank. Coordinating and negotiating issues that arise during the planning process may well be the most difficult part of bank implementation. Entities that may be involved in the bank planning process include Federal and State permitting agencies, county or city planning commissions or other local permitting agencies, Federal and State commenting agencies, development interest groups, and environmental groups. Reaching consensus on difficult decisions among parties with such divergent objectives and interests, not to mention the bureaucratic maze that must be negotiated, is difficult at best and may be impossible without a strong commitment to success on the part of everyone involved. The potential for economically, politically, or environmentally important development projects in the area may serve as the needed catalyst for timely agreement concerning the establishment of a bank. Permitting and commenting agencies often are understaffed for their workload and may place a low priority on trying to develop mitigation banks that are controversial, time-consuming, and possibly even precedent-setting. Months or years can pass without resolution of a complex bank-related decision.

Site Selection

In some cases, mitigation banks have been established as a result of the unintentional or intentional production of extra acres during a project-related mitigation effort (Maddux 1986). However, a bank ideally is a site specifically selected in response to the needs in the area for mitigation wetlands. The first step in site selection is establishment of selection criteria. Criteria can include general considerations, such as historic wetland losses, development trends, predicted rates of wetland loss, local or regional goals for restoration or preservation of various wetland types, habitat diversity, and creation or enhancement of habitat for targeted species (Riddle and Denninger 1986). Other factors influencing site selection include existing resource value, enhancement potential, size, location, cost,

feasibility of acquisition, presence of endangered species, soil and water contamination, reliability of the water supply, and social barriers (e.g., reluctance to convert agricultural areas to wetlands).

All potential sites should be evaluated for their potential to meet the goals of the mitigation bank. When placing priorities on potential sites, the willingness of the landowner to sell needs to be considered (U.S. Fish and Wildlife Service 1983). The site should be available by easement, fee title, or other legally binding agreement; a successful bank cannot be established where the landowner insists on unacceptable deed restrictions. In some cases, banks have been established on public lands. Such banks have both advantages and disadvantages over banks on private lands (U.S. Fish and Wildlife Service 1987). They often are larger because of the availability of large tracts of public land; planning, design, and implementation of the bank occur under more public control and scrutiny; and public agencies may be better able to afford to develop large, expensive bank sites. Disadvantages to banks on public lands include the administration time and expenses that the public agency may have to expend toward bank establishment, and the understandable reluctance of many public agencies to commit to long-term ownership and management of an area as a mitigation bank.

Consideration of the costs of a site usually includes a market value comparison, a determination of whether or not the cost of the land is justifiable in terms of potential resource value, and the amount of money the bank sponsor is willing or able to invest. An additional consideration is the long-term management and maintenance costs likely to be associated with the area being evaluated.

Depending on location, either large or small areas may be preferable as bank sites. In highly developed areas, small, isolated sites may have value as scattered islands of habitat (Riddle and Denninger 1986). Small areas may also be acceptable if they are clustered near other management units. Large sites are likely to be more cost-effective, in terms of acquisition, enhancement, and management costs per unit area, and often provide greater variety in habitat types and more habitat value to fish and wildlife species dependent on large blocks of contiguous habitat. Small sites may only meet the mitigation requirements of one or two development projects, while large sites can be used to consolidate a number of mitigation project needs that might otherwise be difficult to implement and monitor.

Areas being considered as potential bank sites ideally have minimal wetland habitat value before the bank is established, and it should be feasible to increase the habitat value of the area. The physical characteristics of the sites being considered should not present insurmountable obstacles to wetland establishment or enhancement, such as large areas that are at relatively high elevations or areas with an inadequate or unreliable water supply.

Where possible, banks are sited in close proximity to the anticipated development projects, with maximum ecological similarity between the bank site

and the project impact areas (U.S. Fish and Wildlife Service 1987). The closer the credit and debit areas, the more likely that displaced animals will be able to take advantage of the mitigation site.

Proximity to complementary or already managed habitat also is a consideration in siting a bank. Habitat values are greater for many species when a variety of wetland and upland types occur together, and it may be easier to find a management agency willing to accept responsibility for long-term management of a bank when it is adjacent or close to areas that the agency already manages. An increase in certain wetland types, based on historic abundance and loss, current status, development trends, predicted rates of loss, and value to fish and wildlife, can be targeted in bank site selection. Once the potential of each possible bank site is determined relative to both existing local and regional wetland goals and established selection criteria, potential sites can be assigned priorities and higher priority sites evaluated in more detail for both special opportunities and constraints they present to establishment of a bank.

Formal Banking Agreement

A formal, written banking agreement appears to be central to the successful establishment of a mitigation bank because it formalizes consensus among the signatory agencies about the characteristics and use of the bank (Niedzialkowski and Jaksch 1986). This interagency agreement establishes guidelines for bank use and defines the allowable, required, and prohibited actions for all involved parties.

Organization of a mitigation bank needs to be as simple as possible and easily understood. The formal banking agreement ideally reflects a clear understanding of bank formation, structure, implementation, and operation. Existence of such an agreement can lead to greater coordination and cooperation among involved parties.

Development of the banking agreement, to the extent possible, involves all Federal, State, and local permitting and commenting agencies with a significant interest in the outcome, as well as appropriate developers. The integrated planning function vital to successful implementation of a mitigation bank is achieved when all relevant environmental and other concerns are considered by the banking participants, even though agreement may be simpler to reach when fewer issues and participants are involved.

A formal bank agreement includes the following types of items:

1. Specifies that the bank can be used only when the permitting and commenting agencies agree that project redesign, onsite mitigation, and other offsite mitigation options are not appropriate and that the bank has the appropriate habitat value available.

2. Includes or references comprehensive regional plans or goals to which the bank plan is related.

3. Defines the obligations of each involved party to the agreement.

4. Designates the bank overview team, if the overview team will be different than the signators of the formal banking agreement.

5. Includes, at least by reference, the bank enhancement plan that must be implemented prior to allowing use of bank credits, as well as long-term management and maintenance activities and the responsible entities.

6. Defines the decisionmaking process that will be used if conflicts arise concerning the agreement or use of the bank.

7. Establishes who will hold the title or other legal agreement for the bank land.

8. Limits use of the bank to a clearly defined geographic area.

9. Establishes the size of the bank.

10. Includes the methodology that will be used to determine bank credits and project debits and the crediting and debiting process.

11. Establishes a bank manager or coordinator who will maintain the official record of credit and debit transactions for the bank.

12. Identifies the particular types of habitat eligible to be offset by the bank.

13. Specifies the procedure for continued monitoring and evaluation of the bank and related adjustments in bank management or credits.

14. Includes any other restrictions appropriate for the bank.

Even though a variety of agencies may approve establishment of a bank, the formal banking agreement is not a commitment to approving use of bank credits for offsite mitigation of specific projects. When offsite mitigation is inappropriate for a project or in-kind mitigation for a habitat type not present in the bank is required, nothing in any banking agreement alters the responsibilities of the involved agencies to take the most appropriate actions. Agencies involved in a bank retain their ability to ensure that the bank is not used to facilitate inappropriate development projects or to provide inadequate mitigation for project losses.

The advantage to an up-front, clear definition of the minimum standards for bank use is that application of credits can be restricted to environmentally and ecologically appropriate situations (Kerr and Associates, Inc. 1987). Although well-defined guidelines help avoid improper application of bank credits, even the strictest guidelines will not prevent misuse or conflict. If a mitigation bank is available, there will be pressure, especially from developers, to use it.

The time and effort required to develop and implement a mitigation bank should be weighed against the expected benefits (Soileau 1984). One approach

to avoiding waste of significant staff time and money in working on a specific bank proposal is to develop and present a preliminary agreement to potential participants early in the discussions. If critical elements are identified that are unacceptable to one or more key participants, consideration should be given to abandoning the proposed bank at that time unless there is a reasonable expectation that compromise positions on those elements can be reached and a formal agreement finalized.

Design of the Bank Enhancement Plan

An enhancement plan is developed that details the actions that will be taken at the bank site to generate and maintain the habitat credits. The design of the bank enhancement plan considers the constraints of the site selected and the expectations of the various involved agencies (Riddle 1986). As site-specific criteria are developed, regional restoration goals are kept in mind as they relate to enhancement opportunities and constraints (Riddle and Denninger 1986). The habitat values that potentially can be added are a factor in the enhancement alternatives selected for the bank.

Geographic Area of Applicability

Mitigation banks are most likely to duplicate the wetland types that will be lost to development actions if they are located close to the area where the development projects are anticipated (Riddle and Denninger 1986). Geographic restrictions on use of bank credits are defined narrowly enough to reflect differences in ecological and development patterns, but large enough to realistically accommodate the intended types of projects.

Banks generally are restricted to the same hydrologic unit and State as the projects they mitigate. In highly developed areas where potential mitigation sites are at a premium, it may be desirable to define the distance allowable between the bank and the project impacts (Riddle and Denninger 1986). The advantages of such a restriction are twofold: (1) mitigation actions are restricted to a local area, which helps maintain the ecological values and benefits for people living in that area; and (2) permit applicants with projects in areas with high land value are prevented from developing mitigation banks in areas with low land value, leaving developers in the latter areas without local options for affordable offsite mitigation.

Bank Life

The FWS Mitigation Policy states that mitigation to offset project-related habitat losses should replace the value lost both during the life of the project and during the reestablishment of habitat quality on the site once the project has been abandoned (U.S. Fish and Wildlife Service 1981). To be consistent with the Interim Guidance on Mitigation Banking (U.S. Fish and Wildlife Service 1983), the land or activities included in a mitigation bank are "dedicated in perpetuity to fish and wildlife purposes through a legally binding instrument enforceable by the action agency." If not dedicated in perpetuity, the period of effectiveness for the bank should at least equal the life of the project impacts it mitigates.

While some permitted actions have environmental effects that are transitory or occur within a predictable time period, other projects, such as filling a wetland to construct a highway, realistically are expected to be permanent (Niedzialkowski and Jaksch 1986). In similar fashion, wetland creation or other actions that establish and maintain bank credits may be a permanent commitment or the bank agreement may only require active management for some specified period of years.

Interagency Team

In most cases, an interagency team is involved in overseeing development and administration of a mitigation bank. This advisory group has the authority to make decisions about activities critical to successful implementation and use of the bank, as specified in the operational guidelines that are established. The team includes, as appropriate, representatives of State and Federal commenting agencies; local, State, and Federal permitting agencies; permit applicants; and environmental interest groups. Many, if not all, of these entities will have been signators to the formal banking agreement.

Evaluation Methodology

One of the most important elements in the mitigation banking concept is the necessity for a habitat-based method of determining bank credits and project debits that is technically defensible, replicable, and can be applied consistently (Brown et al., in press). Environmental credits and debits become the exchange commodity for the bank, and there is little basis for determining equality in the crediting-debiting process without some agreed-on evaluation methodology (Maddux 1986). The most acceptable evaluation methodology is one that is easily understood by biologists and nonbiologists alike, is simple to use, and can be applied with a reasonable expenditure of time and effort (Minnesota Department of Transportation 1987). In general, a habitat-based evaluation methodology will be superior to more conventional methods, such as acre-for-acre tradeoffs, user-day analyses, or best professional judgment (Brown et al., in press).

The habitat-based analysis is used to quantify the habitat value increases that occur on the mitigation bank site as a result of the enhancement or other management strategies that are implemented. These increases in habitat value constitute the credits associated with the bank. The same methodology is used to determine the project-related mitigation requirements that will be debited against bank credits. The analysis methodology needs to be acceptable to all of the entities involved with the bank and at an appropriate level of detail for the size and complexity of the bank and the scope of anticipated project impacts that the bank will be used to mitigate.

One of the concerns about selecting an evaluation methodology to determine mitigation bank credits and project debits is that the primary emphasis of most analysis methodologies is to characterize the predevelopment condition via a baseline survey, rather than to evaluate the dynamic functional relationships among system components (Ashe 1982). The focus of the FWS Mitigation Policy is on mitigation of habitat losses (U.S. Fish and Wildlife Service 1981), indicating support for habitat value as a more appropriate basis for a

mitigation evaluation methodology than population estimates. The FWS Mitigation Policy concludes that preferred compensation generally involves maintenance of ecosystem structure as a means to ensure ongoing fish and wildlife populations (Ashe 1982).

The analysis methodology used in a banking effort needs to be habitat-based, even if it involves integration of habitat values for a number of different evaluation species. However, evaluation on a species-by-species basis frequently represents the value of the habitat in terms of its ability to support a narrow group of species, frequently those with economic importance, rather than as an overall system component (Ashe 1982). If such a methodology is selected, it needs to include a mix of species that adequately represents the contribution of the habitat in terms of its ecosystem form and function. Species of high public interest or economic importance provide a narrow view of the ecological value of the habitat unless properly balanced with species having broad ecological significance.

At least in the minds of some of the persons who have been associated with mitigation banks, a clear, scientifically acceptable method to determine bank credits and debits is lacking (Riddle 1986). Although the FWS's Habitat Evaluation Procedures (HEP) (U.S. Fish and Wildlife Service 1980) have been widely used with mitigation banks in some States, there have been a number of concerns expressed about its use, and evaluation models for many important wetland species have not been developed or field tested. Some State permitting agencies, at least in California, are reluctant to use HEP because of questions about its reliability and a perception that it reduces their flexibility to determine mitigation requirements on a case-by-case basis.

HEP, originally published in 1976, is a species-specific approach to impact assessment, based on the assumption that it is possible to numerically describe habitat quality and quantity. The value of HEP may be limited with mitigation banks designed to provide compensation for very small project losses. Generally, a full HEP analysis often is thought more justifiable, in terms of the time and costs required, when used for larger projects where there is an ample planning period (Ashe 1982). The difficulties in applying HEP to small projects associated with mitigation banks do not preclude use of a habitat-based methodology in these situations. Simplified habitat evaluation methodologies have been developed and used in mitigation planning related to the permit process in many parts of the country (Kumpf 1979). These procedures assign a relative importance value to each habitat type in a system, rather than evaluate habitats based on their ability to support a selected group of species. Such procedures may result in more subjective results than does HEP because they are based on common perceptions about the relative value of each habitat type to the total ecosystem.

In some cases, permitting agencies set mitigation requirements in the form of "mitigation ratios," which describe how many acres must be replaced for each acre that is impacted (Riddle 1986). The basis for the ratio is often a subjective estimate of the habitat values that will be lost at the development site and the habitat values that will be gained at the mitigation bank site.

Bank Crediting and Debiting

In most cases, mitigation banks are credited only for increased habitat values resulting from management actions taken expressly for mitigative purposes. The extant value of the site as fish and wildlife habitat is not considered when determining credits except when the habitat value of the area is in imminent and unavoidable danger of being lost or degraded unless appropriate action is taken. Fish and wildlife benefits generated incidental to normal land management practices are not considered as either mitigation or bank credits (Soileau 1984).

Bank credits are given only for lands under direct control of the bank sponsor, with no credit given for incidental benefits to surrounding lands. The analysis methodology used on the bank may result in the determination of the average number of credits that will be available annually, such as average annual habitat units. When such a method is used, the credits associated with a particular year may be limited to use in that year, with no accrual of unused credits to the next year. This prevents "front-end loading" of bank credits to make all of the credits that will be generated throughout the life of the bank available to developers as soon as the bank is implemented. It also ensures that increases in habitat value at the bank site precede or occur concurrently with adverse project impacts on fish and wildlife resources.

Some time lag is desirable to allow review and evaluation of the enhancement actions at the bank site before the predicted credits associated with the actions are verified or adjusted and made available for use (Niedzialkowski and Jaksch 1986). Crediting and debiting activities require concurrence of all signators to the formal banking agreement, with a single designated coordinator or manager responsible for maintaining the record of all transactions and for providing summaries of transactions to the other involved agencies on a regular, specified basis.

In order to comply with the regulatory process, a number of criteria need to be met before the offsite mitigation requirements associated with a project are considered as potential debits against bank credits (Soileau 1984):

1. The project requires siting in or adjacent to a wetland or access to a wetland.

2. There is a demonstrated public benefit associated with the project.

3. Project planning has attempted to find alternative sites and development methods that would have the fewest adverse impacts possible and still meet project objectives, and the final project plan reflects the least damaging option.

4. All other means of avoiding or minimizing negative impacts have been exhausted.

5. Onsite mitigation possibilities are unavailable or insufficient to fully compensate for project impacts.

6. Other offsite mitigation options are either infeasible or inappropriate.

7. The mitigation bank has the appropriate type and amount of habitat credits available.

8. For credits to be applicable to a development proposal, in-kind habitat, and/or habitat viewed by the FWS and the State fish and wildlife agency to be of the same or superior value within the same overall area, must be utilized.

A number of cautions are in order on bank debiting. Once a bank exists, there may be pressure to use the bank credits as compensation for project impacts before there has been a complete assessment of the mitigation alternatives for the project and a determination of the most preferable means of mitigating project impacts (U.S. Fish and Wildlife Service 1987). Developers may view the bank as a guarantee of automatic approval and compensation for future permit applications.

The FWS has as a goal the conservation and enhancement of wildlife benefits for future generations (U.S. Fish and Wildlife Service 1983). To be consistent with this goal, it is not acceptable to debit all of the bank credits that will be generated throughout the life of the bank early in the bank life or to offset wildlife losses with fisheries credits or vice versa.

Project impacts that are expected to last longer than the dedicated life of the mitigation bank may preclude use of bank credits (Soileau 1984). Use of a bank dedicated for 25 years to mitigate project impacts predicted to last 100 years is contrary to the goal of ensuring fish and wildlife resources for future generations.

In California, and potentially in other States, some banks have been implemented by public or private nonprofit environmental organizations, such as the California State Coastal Conservancy, on a mitigation fee basis. Once the organization has purchased and enhanced an area as a mitigation bank site, permit applicants can enter into an agreement to pay a "mitigation fee" based on the habitat replacement requirement and the unit cost for the bank (Riddle and Denninger 1986). The bank sponsor determines the costs that the bank working group has decided are appropriate to pass on to permit applicants in the form of mitigation fees. In general, these costs include acquisition, enhancement, planning, construction, management, monitoring, and up to an additional 10% of project costs to cover administrative responsibilities.

One of the problems associated with mitigation fee banks is establishing a mechanism to cover the costs of ongoing management and maintenance (Riddle 1986). Although developers who use the bank to meet their mitigation needs logically are responsible for these costs, the bank sponsor may have difficulties determining an appropriate amount to include in the mitigation fees to cover these unknown future costs. One solution to this problem is for permit applicants to establish an annuity fund that the bank sponsor can use to pay for management and maintenance costs over the life of the bank.

Other problems with mitigation fee banks include the difficulty in finding public or private sponsors willing or able to bear what may be significant costs for some indefinite period. Although the bank sponsor can expect eventual reimbursement, this may not occur for several years. In addition, mitigation fee banks appear to be particularly susceptible to the public perception that permits are being bought and sold.

Advantages of mitigation fee banks include the ability to provide permit applicants with an estimate of how much their required mitigation will cost based on the fixed charge for mitigation credits (Riddle 1986). Mitigation costs may be considered by a project developer when deciding whether to proceed with a project as planned or scale it back.

The regulatory procedure for a mitigation fee bank is much the same as it is for banks sponsored directly by permit applicants (Riddle and Denninger 1986). The adverse impacts of proposed development projects are quantified; permitting and commenting agencies must agree that project redesign, onsite mitigation, and alternative offsite mitigation options are either unavailable or infeasible; and the mitigation bank must have the appropriate type and amount of habitat available. If these conditions are met, the wetland development permit is conditioned with payment of a mitigation fee directly to the bank sponsor. This form of mitigation banking should not be confused with an "in-lieu fee" program, where developers pay fees into an accumulating fund that is, when large enough, used to purchase and enhance degraded areas (Riddle 1986). With in-lieu fee programs, the lag time may be months or years before the mitigation project actually occurs and project-related habitat losses are compensated. In some cases, replacement mitigation may never occur either because the deposited fees are not adequate to cover the cost of acquiring and enhancing a mitigation site or it is not possible to locate and acquire an appropriate mitigation site (Riddle and Denninger 1986).

In some cases, selling and trading bank credits have been accepted as reasonable extensions of the mitigation banking concept. Credits established at the bank site in excess of the needs of the bank sponsor are sold or traded to other developers. Such a transaction usually requires the concurrence of the bank management or overview team and is in accordance with the conditions for use of credits established in the formal banking agreement.

The ability to sell or trade credits provides the bank sponsor with an opportunity to recover some expenses associated with implementing the bank and may be added impetus to initiate or increase wetland management programs (Soileau 1984). Agencies overseeing the bank need to participate in agreements that involve the selling or trading of bank credits to the extent necessary to ensure that sale or trade of credits remains in the context of satisfying mitigation requirements and is not perceived as "buying" permits or projects (U.S. Fish and Wildlife Service 1987). Existing policy precludes FWS involvement in the financial transactions inherent in selling bank credits (U.S. Fish and Wildlife Service 1983).

Management and Maintenance

Successful mitigation banks are dependent on continued management and maintenance throughout the life of the bank. If the bank sponsor is unwilling or unable to commit to the long-term ownership or management of the bank site, some other entity that is willing to accept responsibility for these activities needs to be identified. People who have been involved with mitigation banks often recommend that bank management and, at least in some cases, title to the land, be turned over to a State or Federal agency with responsibility for protecting the public interest in environmental resources (Niedzialkowski and Jaksch 1986). Where the developers that sponsor or use the bank remain responsible for the cost of ongoing management, maintenance, and necessary remedial work, they can establish an annuity fund that is available to the agency responsible for the actual activities over the life of the bank (Riddle 1986). This type of arrangement only works when the bank sponsor or developer(s) is willing to tie up funds in a long-term interest-bearing account.

Monitoring and Evaluation

Monitoring and evaluation activities, undertaken at intervals throughout the life of the bank, determine the effectiveness of the management program. These assessments, usually made by members of the bank overview team, can be followed by adjustments in available credits or recommendations for structural and operational changes needed to improve the outcome of management activities. The bank sponsor or other responsible entity, as part of the formal banking agreement, should have agreed to implement the recommended changes to the extent possible.

IMPLEMENTATION RECOMMENDATIONS

Mitigation banking is being used with some success, particularly on the West Coast and in the Southeast (Brown et al., in press). Although banking appears to have a definite place in mitigation activities, the concept must be very judiciously applied. Mitigation banking can be a viable option for compensating for unavoidable losses related to permitted actions, especially where there is a past history of failure to obtain full mitigation for permitted activities and little likelihood of improving the situation via the COE's current regulatory program (Soileau 1984).

Mitigation banking has different applicability to different areas and different types of projects, but banks can be valuable where they are structured and administered carefully and other mitigation possibilities are limited or nonexistent (Short 1987b). Banks have their greatest potential applicability where no mitigation would otherwise occur, such as where several small projects are involved that would be difficult or impossible to mitigate on an individual basis or where there is no possibility for onsite mitigation and the applicant will support offsite mitigation. In these situations, resources might be lost unnecessarily if the involved agencies arbitrarily refused to consider mitigation banking as an option.

Mitigation banks generally are considered only when habitat improvement activities create justified and measurable benefits to fish and wildlife habitat values (Brown et al., in press). In addition to providing measurable benefits to fish and wildlife resources, banking efforts can provide developers with tangible incentives for further wetland protection actions in the form of improvements in the permit processing procedure, public recognition for their mitigation efforts, and possibly even the recovery of a portion of their costs through the sale or trade of credits (Soileau et al. 1984).

The following recommendations are intended as guidance in the use of mitigation banks. The recommendations are based on the results of this evaluation and interactions with FWS personnel familiar with the banking concept. The goal of the recommendations is to increase the likelihood of successful implementation and administration of banks when FWS and other agency personnel choose to pursue this mitigation approach.

Deciding on the Appropriateness of a Mitigation Bank

Mitigation banks are one tool for achieving mitigation for unavoidable habitat losses primarily associated with Section 10/404 permit activities. Banks can be used to mitigate unavoidable losses from specific future development actions and appear especially applicable for small projects with individual losses that are relatively minor and cannot be fully mitigated on, or immediately adjacent to, the project site. A decision chart to help determine when banking efforts may be appropriate is presented in Figure 1.

Mitigation banks are used most often in the permit arena, but also have applicability for small, predictable, recurring Federal projects. Most Federal projects are likely to be larger than can be accommodated by a bank and more often lend themselves to onsite mitigation programs.

Review Procedure for Mitigation Bank Involvement

Within the FWS, the initial contact for most mitigation banks is at the Field Office level. However, Regional Directors should be kept informed about banking activities in the Region. The Regional Director may wish to review, or even approve, banking efforts initiated in his or her Region or set up a Regional peer review procedure. Regional reviews should be both administrative and legal, which can be provided by the Regional Solicitor.

Bank Size

There probably are practical limits to bank size, but any decisions on the maximum or minimum size of an area that can be effectively managed as a bank are best made on a case-by-case basis. Too small is more likely to be a problem than is too big. Some small banks may be more time-consuming and costly to set up and maintain than they are worth in terms of mitigation benefits. On the other hand, small banks may be important from a geographic perspective or when located adjacent to other protected, managed areas.

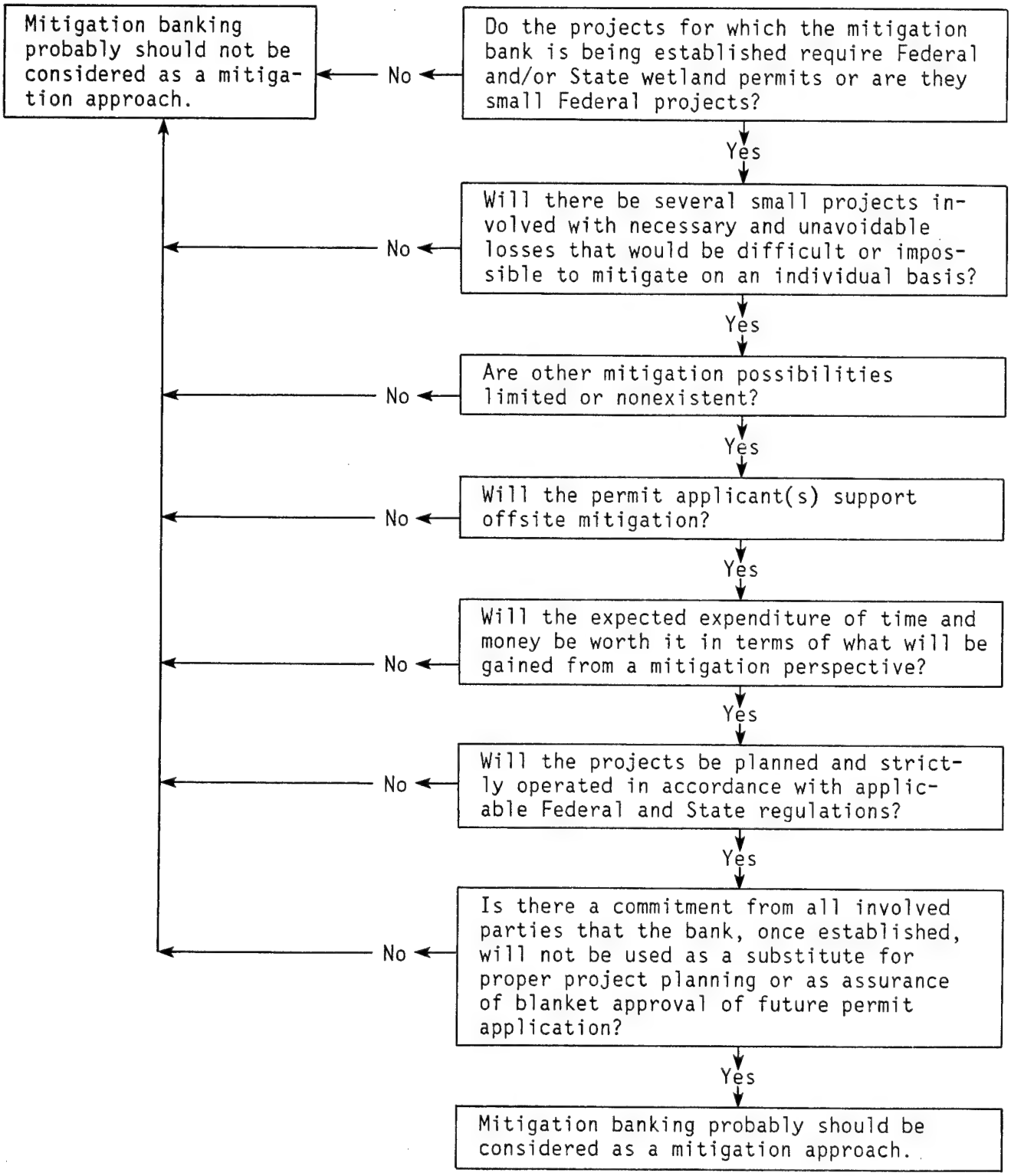

Figure 1. Determining the appropriateness of a mitigation banking effort.

Bank Life

The time period over which credits are generated in the bank should be at least equal to the period of time during which impacts will occur from projects mitigated by the bank. A bank life in perpetuity is ideal from a fish and wildlife resource perspective if it can be accomplished and there is reasonable assurance that increases in habitat value resulting from mitigation actions will be "permanent." In some cases, banking agreements may be written that are effective only until all bank credits have been used. Some stipulation or arrangement needs to be made in such cases to ensure that active management of bank land to retain its increased habitat value will occur at least as long as there are project impacts.

Bank Management Options

Banks should be as flexible as possible within established mitigation policies and permit review procedures. Although in-kind replacement generally is the primary goal, banking agreements should be written to take advantage of appropriate opportunities that involve regional restoration goals. While "trading-up" by accepting out-of-kind mitigation is an attractive option under certain circumstances, determining the amount of mitigation that should be performed under such an arrangement can be a difficult calculation and needs to consider the fact that the habitat type lost to the project will not be replaced. Considering a bank as an opportunity to enhance and restore wetlands from a regional perspective should not conflict with the intent to mitigate specific project-related losses and local priorities.

Bank management options to establish credits can include wetland enhancement, restoration, creation, preservation, or some combination of these activities. Enhancement actions are designed to increase existing wetland habitat values on bank land. Enhancement actions often are aimed at specific species or groups of species; measures of success usually involve evaluations of changes in populations of species expected to benefit. Enhancement is a desirable bank management option when there is interest in the habitats that can be improved and the species that will benefit.

Restoration and creation are the two options that can result in no net loss in wetlands. Restoration usually involves the removal of physical barriers that have caused an area to lose its wetland functions and values. This is a potential bank management option in situations where there is a reasonable potential of achieving the desired restoration result. Creation involves establishing a new wetland to replace a lost wetland. Wetland creation techniques are still experimental. Trading an existing productive wetland for the potential of an artificially created wetland should be approached with great care, given the current state-of-the-art knowledge about creating wetlands that will successfully duplicate the functions of other wetlands.

Preservation generally is discouraged as a mitigation option, although it occasionally is accepted when the land has high value as fish and wildlife habitat and there is a genuine and immediate threat that the area will otherwise be lost or degraded. In most cases, purchase alone or simple

transfer of land ownership to a public agency does not constitute a mitigation bank; management to increase habitat values must be included in order to generate bank credits. When preservation credits are allowed, they can be calculated based on the habitat loss prevented over some reasonable period of time or the mitigation that would have been required for the threatening activities. One means of demonstrating preservation value or loss avoidance is to show that the project that would result in destruction of the area has already received all required State and Federal permits. This prevents situations where credits are assigned for activities that are still in the speculative stage.

Bank Land Ownership

Land used for a mitigation bank usually either is already owned by the developer or is obtained from willing sellers; permit applicants ordinarily do not have condemnation authority. Title to the bank land can either be retained by the developer or turned over to a State or Federal agency or an appropriate private nonprofit organization. When land is turned over to the FWS, it should meet FWS objectives and goals as a land management agency, fit into the Refuge or other system, and be accompanied by needed management funds. Although title transfer is desirable, easement or deed restrictions can be used to ensure that the habitat values remain throughout the life of the project impacts for which the bank serves as mitigation.

It may not be reasonable to expect a developer to hold and manage bank lands when the bank life is to exist in perpetuity. In this situation, transfer of bank land to the public sector probably is more appropriate. However, there should be a commitment from the developer to provide management dollars equal at least to the life of the project impacts. If the developer retains title to bank land, resource agency oversight and revisionary language in legal documents can be used to secure the bank land for its intended use and a performance bond can be posted to ensure that bank management and maintenance continue.

In some cases, mitigation banks may be appropriate on State or Federal lands, although support for establishing banks on existing public land is not universal. Objections to the use of public lands for banks include the following concerns:

1. Mitigation banks should not be established on land that is already protected.

2. Management of public lands does not seem like an acceptable way to achieve mitigation credits.

3. There may be legal problems related to unauthorized augmentation of Federal budgets when private parties pay for management projects on some types of public land established to provide wildlife habitat, such as refuges and waterfowl production areas.

4. Use of public lands for mitigation banks may lead to conflict of interest charges or the appearance that permits are being "sold."

Mitigation on public land may be more appropriate for public projects than for private party projects. In any case, mitigation needs to be paid for or implemented by the developer, meet the management objectives and be of high priority for the involved public area, and not be reasonably expected to get funded otherwise in the near future.

Technical Acceptability of Mitigation Techniques

A mitigation bank is not a practical alternative unless it is technically feasible to implement the needed mitigation. Banks should be implemented only if there is reasonable assurance that bank management goals will be achieved. Determining relative merit of available mitigation techniques is a complex subject with a host of variables. Guidelines that can be used in the selection of appropriate techniques for a bank include the following:

1. Use standard, state-of-the-art mitigation techniques; banks should not be established with experimental or high-risk technologies.

2. Mitigation techniques should be sufficiently advanced in terms of design that there can be biological and engineering evaluations of specifications prior to signing a formal agreement for bank establishment.

3. Techniques should lend themselves to monitoring and evaluation to determine success in meeting bank objectives.

Banking Agreements

Probably the single most important item in ensuring the successful implementation and administration of a mitigation bank is the development of a formal, legally enforceable banking agreement. Although it would be difficult to develop a standard format for a banking agreement that would fit the wide variety of circumstances that can occur, consideration should be given to including the following:

1. background, goals, and objectives of the bank;

2. comprehensive regional plans or goals to which the bank is related;

3. bank establishment plan, including mitigation measures to be taken;

4. carefully defined bank operation criteria, including:

    a. geographic area and ownership of bank lands,
    b. life of bank,
    c. evaluation methodology and procedures,
    d. bank credit and debit procedures,
    e. accounting procedures,
    f. project applicability criteria,
    g. geographic applicability of bank credits,
    h. bank management and maintenance arrangements, and
    i. overview team responsibilities.

5. short-term and long-term monitoring and evaluation activities, and methods of modifying bank management if initial efforts fail to produce expected results;

6. obligations of each involved party to the agreement;

7. decisionmaking process that will be used if conflicts arise concerning the agreement or use of the bank; and

8. any other appropriate restrictions.

Evaluation Methodology

The evaluation methodology needs to be established on a case-by-case basis, depending on the variables of the mitigation bank being considered. However, some type of habitat-based assessment technique, agreed to by all parties, should be used, and the "currency" should be consistent within each bank. Both HEP76 and HEP80, as well as other methodologies, have been used with mitigation banks. For some banks, an evaluation methodology that measures functional values and has a habitat component, such as Adamus and Stockwell (U.S. Department of Transporation 1983) or the Wetland Evaluation Technique (WET) (U.S. Army Corps of Engineers 1987) may be more desirable than a methodology that is species-oriented.

Debit and Credit Procedure

Ideally, bank credits should be guaranteed only if they actually are realized. Unsuccessful management actions should be revised as needed to provide the anticipated habitat values or available credits should be adjusted. It is difficult to support debiting project impacts against a bank unless the mitigation activities have already been successful in generating sufficient credits to cover the debits. In reality, some negotiation may need to be considered if the bank management plan unexpectedly fails after the bank sponsor has made a "good faith" effort and a large management investment. If the agreed-on mitigation specifications were implemented, the developer logically has met his obligation, regardless of the success of those activities, unless some contingency plan was developed at the time of bank establishment. Contingency plans may prescribe a revised management plan, partial crediting, or both. Guaranteeing some percentage of anticipated bank credits regardless of the outcome of the bank establishment places considerable burden on resource agencies to ensure that the management program for habitat improvement is well thought out, designed, and implemented so that there is reasonable assurance of success in generating the credits. Speculative or nonspecific mitigation measures are not appropriate for mitigation banks.

Bank credits should be based on a realistic prediction of the future-without-bank-management conditions. Before accepting a bank, the involved agencies should feel confident that the sponsor would not have initiated the habitat improvement measures without the incentive of earning banking credits.

Evaluation activities should occur after the habitat improvement measures are completed to determine the actual changes in habitat value that occurred on the bank land, and the results of the evaluation activities should be incorporated into bank management. The evaluation should determine if additional or different mitigation efforts are needed and the actual credits that will be made available to developers, which may be either more or less than original predictions. In general, permit applicants should not be able to debit the bank until after the implementation work has been completed and accepted and the actual number of available credits determined. Concurrent development of the bank and project activity may be acceptable on a very limited basis if it has been agreed to previously and bank development will be completed prior to, or at the same time as, the project. However, such activity is not in strict agreement with the concept of banks providing mitigation in advance of project impacts. Project impacts should not occur prior to mitigation activities when banks are being used to offset project losses.

Accounting responsibilities for crediting and debiting activities can be assigned to a public resource agency that was a signator of the formal banking agreement, the primary agency involved in setting up the bank, the bank sponsor (with oversight and guidance from an advisory board of representatives of the agencies involved in the bank), or a multiagency management or oversight team, usually with a designated chairman.

Not even the strictest language possible in a formal banking agreement can guarantee that credits will be used only for truly unavoidable project impacts on fish and wildlife. Projects proposed for debiting must go through the normal project review process and be in compliance with all applicable wetland laws, regulations, and policies. All avoidable project impacts must have been resolved and possible onsite mitigation accomplished. Agencies involved in the bank or responsible for its oversight must agree that practical, alternative forms of compensation for unavoidable habitat losses do not exist.

The area of applicability of credits varies with the situation. The bank should be located as physically close as possible to the projects for which it will serve as mitigation, generally within the same watershed or ecoregion and always within the same State. Important considerations are that the bank be located within the area of occurrence of desirable habitat type(s) and where it will benefit the evaluation species being adversely impacted or targeted for emphasis.

Selling or trading credits may be a reasonable extension of the mitigation banking concept in some situations. When this is considered, bank managers and advisory agencies should base their determination of applicability of proposed project debits on the criteria for bank use established in the banking agreement. A formal approval process for the sale or trade of bank credits can be established, and the parties involved with the bank given veto authority over such activities.

Mitigation Ratios

Although acre-for-acre tradeoffs generally have not been recommended for use with mitigation banks, they may be appropriate where no better assessment methodology is available or feasible for the area, circumstances, or banking objectives. Ratios, which are not necessarily one-for-one exchanges, can be based on areas of equal habitat value, similar habitat and resources in the bank and project areas, previous assessments (such as HEP), or be the "shorthand" expression of modified habitat evaluations, especially when very small project areas are involved.

Setting a Dollar Value on Bank Credits

A value is set on bank credits when the credits are being sold or traded between developers and in situations where the bank land has been purchased and developed by a trust fund or party other than the permit applicants using the credits as mitigation. In such cases, credit values include the costs of land purchase, habitat improvement measures, management and maintenance, administration, and other applicable costs associated with setting up and operating the bank. Great care must be taken that such banks do not give the appearance that developers are being allowed to "buy" permits through the purchase of bank credits.

In-lieu fee programs, where permit applicants make financial contributions to a trust fund for future land acquisition and management, do not constitute a mitigation bank. In such cases, the timing and type of future actions associated with the trust fund are undetermined, and there is no assurance that appropriate mitigation for project losses will occur or, if it does, when.

Long-term Bank Management and Maintenance

Responsibility for long-term bank management and maintenance should be clearly defined and agreed to in the formal banking agreement. Two general options exist: original bank sponsor (developer), with appropriate deed, lease, or easement restrictions and resource agency oversight; or transfer of the land to a public agency, with the necessary funds supplied by the bank sponsor and transferred or otherwise made available to the public agency to cover bank management costs.

Whoever "receives" the credits should be responsible for the costs of bank management and maintenance, even if they are not responsible for the actual activities. The first choice for management responsibility may be a natural resource agency or private environmental organization because of their interest and experience in managing habitat for fish and wildlife resources and their greater long-term stability. The money necessary for continued management and maintenance of the bank can be guaranteed by the developers through: (1) specified annual payments; (2) depositing sufficient funds in a long-term interest-bearing account with periodic interest payments that cover bank management costs; (3) trust fund; or (4) special ear-marked account. When management responsibilities lie with a private party, success depends on

how strong the management guarantees are. Some resource agency or team of agencies should have overview responsibilities and enough authority to ensure that it can require the private party to take necessary actions.

Monitoring and Evaluation

There should be periodic follow-up monitoring and assessment efforts to evaluate the effectiveness of the management program throughout the life of the bank, along with a mutual agreement about a mechanism to modify the management of the bank as needed based on the result of these activities. An additional benefit of monitoring and evaluation efforts is the information they provide on the effectiveness of mitigation techniques. There should be interagency responsibility for the monitoring activities, with the procedure to be followed and the source of funding specified in the formal banking agreement.

LEGISLATIVE AND POLICY BACKGROUND

LEGISLATION

The Fish and Wildlife Coordination Act requires that conservation of fish and wildlife resources receive equal consideration and be coordinated with other features of Federal land and water resource development and regulatory programs. If such developments may adversely affect the public benefits provided by fish and wildlife resources, the Act requires that State and Federal resource agencies recommend measures to mitigate such losses. Pursuant to Congressional direction, the FWS has the responsibility to seek mitigation for losses of fish, wildlife, their habitat and uses thereof from land and water development.

All but one of the mitigation banks with FWS involvement were developed in response to mitigation requirements associated with the Section 10 (Rivers and Harbors Act) and Section 404 (Clean Water Act) permitting process. The 1899 Rivers and Harbors Act was designed to prevent destruction to navigation, as well as to protect public health and safety in the commercial use of navigable waters. Section 10 of the Rivers and Harbors Act prohibits dredging, filling, or other activity that would impact the navigable capacity of any water without a permit from the Secretary of the Army acting through the U.S. Army Corps of Engineers (COE).

Section 404 of the Clean Water Act is the principal authority for Federal regulation of wetlands. It provides the COE and the Environmental Protection Agency (EPA) with greatly expanded permit authority over dredge and fill activities in the Nation's wetlands. Even so, only a small percentage of the wetland acres lost each year are regulated under Section 404 (Niedzialkowski and Jaksch 1986).

The COE and the EPA, with input from the FWS and the National Marine Fisheries Service (NMFS), have been working on a joint mitigation policy. The recommendation of the FWS Director was that, as a first step, all Section 404 permits be screened under the EPA Guidelines for Specification of Disposal Sites for Dredged or Fill Material, as published in the Federal Register in 1980 (Laney et al. 1987). Permits successfully completing this screening process would be subject to a sequential process of mitigation planning during the public interest review process. The planning process should culminate in permit conditions that mandate mitigation for unavoidable losses to fish and wildlife wetland habitat. The effective implementation of such a mitigation policy should reduce the need for offsite mitigation and, with it, the potential benefits associated with mitigation banks. In reality, there are few if any practical alternatives to some form of offsite mitigation for many projects at this time.

In the current regulatory climate, it frequently is difficult to convince the COE to condition any permit to require offsite mitigation for unavoidable impacts (Laney et al. 1987). The COE generally requires no additional mitigation for projects it determines to be in the public interest, such as publicly-funded highway projects. However, a determination was made in 1975 that wetland easements are subject to Section 4(f) of the Department of Transportation (DOT) Act (U.S. Fish and Wildlife Service 1986). Section 4(c) includes the statement that the use of easement wetlands for transportation projects shall not be approved unless: "(1) there is no feasible and prudent alternative to the use of such land, and (2) such program includes all possible planning to minimize harm." Department of Transportation Order 5660.1, Preservation of the Nation's Wetlands, was issued in 1975 and contains DOT's policy of "protection, preservation and enhancement of the Nation's wetlands to the fullest extent practicable...".

The COE, at least in some regions, has not been very supportive of mitigation banking (Short 1987a). The COE often takes the position that, if any offsite mitigation is to occur, it must be the result of a negotiated agreement between the permit applicant and the commenting agency or agencies (Laney et al. 1987). This not only places the FWS and other commenting agencies in the position of mitigation negotiators that lack regulatory authority, but also means that offsite mitigation for unavoidable losses may end up being a voluntary action by a developer. Developers tend to view the FWS as anti-development or an obstructionist when mitigation must be negotiated after review comments on the permit application are provided to the applicant by the COE.

With current personnel and budget constraints at the field level, the FWS and other commenting agencies may not recommend offsite mitigation for development projects that individually involve only minor habitat losses, even though these projects may cumulatively lead to significant fish and wildlife habitat losses (Laney et al. 1987). The FWS views offsite mitigation, which involves habitat replacement, to be the last step in the mitigation planning process that begins with impact avoidance (U.S. Fish and Wildlife Service 1983).

INTEGRATION OF MITIGATION BANKING INTO THE REGULATORY PROCESS

Although the FWS is not the regulatory agency in the Section 10/404 permit process, the FWS participates in the process by evaluating potential project impacts on fish and wildlife and by recommending appropriate mitigation for those impacts to the regulatory agency (the COE). Receipt of a request for early environmental coordination often is the first step in coordination (Laney et al. 1987). Once a request has been received, as well as during later review of related environmental documents, commenting agencies provide information about significant fish and wildlife resources likely to be impacted. This review process includes an assessment of possibilities for avoiding or minimizing impacts associated with the project and availability and practicality of onsite mitigation measures.

The final environmental document for a project should contain both the justification for the selected mitigation measures and an indication of whether or not mitigation bank credits will be used for the project (Laney et al. 1987). The project design must be finalized before debits to the bank can be determined. The time allowed for response to a Public Notice by the FWS and other commenting agencies is limited. Although impact evaluation for a project and preparation and circulation of a debit transaction sheet to the bank management team can occur subsequent to issuance of the Public Notice, the permit applicant may be able to avoid unnecessary delays by providing information prior to permit application. When the permit applicant provides appropriate information prior to issuance of the Public Notice, the Fish and Wildlife Coordination Act Report, which is provided to the COE, can include both appropriate mitigation measures and a recommendation about the use of the bank. The permit applicant completes the process by advising the FWS and other involved agencies of its willingness to use the bank in the recommended manner to mitigate the project.

Mitigation banking negotiations for development projects that involve areas with endangered species must be in accordance with the requirements of the Endangered Species Act, with input from the FWS Endangered Species Program and involved State agencies.

FEDERAL AND STATE AGENCY INVOLVEMENT IN MITIGATION BANKING

Corps of Engineers

The COE has the ultimate authority to condition Section 10/404 permits with mitigation requirements, based on input from the commenting agencies. There is no specific National COE policy regarding mitigation banking, although the COE generally does not favor offsite mitigation requirements (Kerr and Associates, Inc. 1987). The various COE Districts have considerable autonomy, and some Districts have been more willing than others to consider involvement in banks. Reservations expressed by COE personnel from the Lower Mississippi Valley Division about the desirability of COE involvement in banking exemplify concerns of other COE personnel:

1. A mitigation bank can be used to require more mitigation than is justified by regulation. For example, the COE does not view offsite mitigation as necessary or justified for some types of projects, even when no onsite mitigation options exist.

2. Once a bank has become established, the precedent of requiring mitigation on all projects could become entrenched.

3. Automatic or arbitrary mitigation requirements violate the COE's regulatory responsibility to make a public interest determination on individual projects. Some developers may be willing to accept mitigation conditions simply to expedite the permit process; no permit applicant should be required to do so, and many will not want to.

4. In the event of a challenge by a local government or environmental group to the continuing validity of a bank, the COE needs the flexibility to make decisions that may violate the terms of the banking agreement or even decide that the bank no longer can be used for development projects that require offsite mitigation.

5. It is a misuse of COE resources to expend time and money on a planning effort, such as mitigation banking, that will not have a formal regulatory result. A Memorandum of Understanding or Agreement as the only end product usually is too weak to justify the effort.

6. From the COE's perspective, the principal benefit of mitigation banking is that it lowers the likelihood of problems for the permit applicant with the commenting agencies during the permit process. This benefit has pragmatic value because the COE is unlikely to reject a permit application that has the approval of the commenting agencies.

Environmental Protection Agency

Although EPA has concerns about possible misuse or mismanagement of mitigation banks, EPA personnel believe that banking is a possible means to meet private and public sector goals (Ciupek 1984). One of the advantages cited is that banking may reduce some of the negative perceptions about the Section 404 program. This may be especially important in coming years as water resource development needs continue to grow. EPA, however, is concerned that pressure may develop to use banks to justify otherwise undesirable projects. There are provisions in Section 404 [e.g., Section 404(c)] for EPA actions that provide some protection from local political or other attempts to influence decisions about development projects.

In a 1984 memorandum (Ciupek 1984), it was suggested that EPA accept banking more as a practice than a concept and develop at least interim guidance to ensure that the Nation's wetlands receive the fullest protection possible when banking is used, encourage EPA involvement in banking agreements negotiated by other agencies, and establish a consistent agency approach to the concept. The memo also suggested that EPA coordinate its efforts with other Federal agencies, in particular the FWS and the NMFS, that already are active participants in mitigation banking activities.

EPA has not yet issued National policy on mitigation or mitigation banking beyond the Section 404(b)(1) guidelines (Niedizalkowski and Jaksch 1986). These guidelines mandate avoidance of impacts where possible and, if not avoidable, taking all appropriate and practicable steps to minimize adverse impacts. EPA Region 10 has issued a Section 404 mitigation policy (U.S. Environmental Protection Agency 1985) stating, in part, that:

> "EPA will actively promote and support mitigation banking and will provide technical assistance to federal and state agencies seeking to establish a banking program. EPA will not support the use of a mitigation bank to justify a project which is not otherwise in compliance with the § 404(b)(1) guidelines."

National Marine Fisheries Service

The general policy of the NMFS is that the concept of mitigation banking has potential promise but is, as yet, unproven (Dr. Nancy Foster, Director, Office of Protected Resources and Habitat Programs, NMFS, 1825 Connecticut NW, Washington, DC 20235; 10 June 1988, pers. comm.). NMFS Regions are encouraged to enter into banking agreements in order to gain experience in this area.

States

Although some States have supported mitigation bank efforts, other State and local wetland program personnel have expressed concern with the concept (Cowles et al. 1986). These concerns center around two factors: (1) developers may try to incorporate banking in their initial application as a de facto "application fee"; and (2) incomplete knowledge about the length of time it takes to establish a functioning wetland, the extent of the area needed to provide mitigation for wetlands that will be filled, and uncertainties about the likelihood of duplicating all the functions of an existing wetland in a mitigation wetland.

California. Development pressures are great in California coastal wetlands, and it is difficult to formulate policies for these areas that both protect natural resources and accommodate appropriate development. The 1980's have been a decade of unprecedented growth in most coastal cities, with major airport and port expansion projects and numerous smaller projects (Riddle 1986). Compensation for these projects is complex and difficult for all involved parties. Permit conditions requiring mitigation often are vague about goals and specifications. Applicants frequently fail to meet permit mitigation conditions, and mitigation for small projects can result in fragments of habitat that have limited habitat value (Riddle and Denninger 1986).

California was the first State to attempt codification of the concept of mitigation banking, through the California Lands Banking Act proposal (Ciupek 1984). The mitigation fee type of bank was utilized, where private parties make payments to a State agency in return for mitigation credits to cover project impacts. Several California agencies and private nonprofit organizations have sponsored coastal wetland mitigation programs (Riddle and Denninger 1986). These agencies, prior to implementation of the program, lacked sufficient funds to carry out desirable, but large and expensive, mitigation projects.

Mitigation banks in California are viewed as one means to avoid problems associated with in-lieu fees, lag time between project impacts and related compensation, and uncertainty about whether or not required mitigation actions are taken (Riddle and Denninger 1986). Where wetland banks are sponsored by State agencies, benefits include the fact that the bank is implemented by a resource agency with experience in wetland restoration and strong motivation to complete the project (Riddle 1986). In addition, the need for permitting agencies to monitor compliance with mitigation requirements is eliminated when the State agency agrees to be accountable for establishment and continued management of the bank.

Seasonal wetlands are the type of wetland most threatened by development in the San Francisco Bay area (Riddle and Denninger 1986). Most of these seasonal wetlands were created by diking former tidal marshes to limit or eliminate tidal action. Bank working groups in the area have been opposed to altering seasonal wetlands because of their habitat value and have supported efforts to enhance existing conditions over efforts to restore seasonal wetlands to historic tidal habitat.

In highly developed Los Angeles and Orange Counties, only a few fragments of restorable disturbed wetlands remain, and those few have already been targeted as mitigation sites for specific development projects (Riddle and Denninger 1986). If banks are established in this area, they are likely to be in the form of mitigation fees for enhancement actions on lands already in public ownership or for organizations to use to purchase properties too expensive for such organizations to acquire without supplementary funds.

Oregon. Oregon has a fairly specific set of State-level mitigation policies (Maddux 1986). Opportunities and criteria for using mitigation banks are defined by State Administrative Rule, and banking must be by written agreement with the Oregon Division of State Lands. State efforts at banking mostly have occurred where estuarine areas are created or restored prior to their use in mitigating project impacts.

Oregon requires that mitigation be integrated in the land-use planning process preceding the permitting phase (Maddux 1986). A formula was developed for estimating credits and debits based on an evaluation of habitat types on an estuary-by-estuary basis. Estuary managers rank the importance of each habitat type in an estuary on a scale of 1 to 10. This ranking is combined with acreage to determine mitigation credit and liability. Project debits are estimated by determining the types and acreages that will be impacted at the project site and multiplying those numbers by the relative value of the respective habitat type. On the bank site, credits are estimated by predicting the habitat types most likely to be present after bank establishment, multiplying their relative value and area, and adjusting for the areas, types, and relative values existing prior to bank implementation.

Oregon's goals for mitigation banking include reducing development costs by increasing predictability in the permitting process and taking advantage of economies of scale (Maddux 1986). Banks must be located in the same estuary as the projects they mitigate. Port authorities often are selected as bank administrators because of their broad powers of land acquisition and development.

Louisiana. Louisiana has a coastal wetland loss of over 40 mi^2 per year, the majority of which is privately owned (Dunham 1986). Considerable emphasis is placed on management actions that reduce the rate of loss, including establishment of mitigation banks. Banks serve as an incentive to both private landowners and industry to increase wetland management for a variety of tangible benefits. Benefits can include both credits to offset project losses and income associated with hunting and trapping leases on the improved wetland habitat.

The Coastal Management Division of the Louisiana Department of Natural Resources requires a marsh management plan to accompany any permit application involving the construction of water control structures in coastal wetlands (Kerr and Associates, Inc. 1987). Development, implementation, and monitoring of the marsh management plan are cooperative activities between the Division and the U.S. Soil Conservation Service. Offsite mitigation for marsh development activities often is required by the Division, and the legal and administrative elements of mitigation banking are within the Division's scope of activities.

North Dakota. North Dakota has approximately 2.5 million acres of prairie potholes (Leitch et al. 1987). In 1987, the North Dakota Legislature passed Senate Bill 2035, known as the "No Net Wetlands Loss Bill," which requires that certain drained wetlands be replaced on an acre-for-acre basis. The Bill retains existing State drainage regulations that require anyone proposing to drain a wetland with a watershed area of at least 80 acres to obtain a permit from the State Engineer. The Bill also establishes a State wetlands policy that the State Engineer and State Game and Fish Commissioner must find that "...wetland acres proposed to be drained will be replaced by an equal acreage of replacement wetland, or through debits to the wetland bank."

Created by the new law, the wetland mitigation bank will be maintained by the State Engineer. Effectiveness of the "no net loss" concept will depend on the frequency and criteria for reconciling credits and debits (Leitch et al. 1987). The Bill specifies that debits to the bank may not exceed 2,500 acres; once this limit is reached, no further drainage permits will be granted. The bank credit and debit account will be reconciled each time a drainage application is filed.

Other States. A number of other States, including Colorado, Missouri, and New Jersey, currently are exploring possibilities for State involvement in mitigation banks.

CURRENT U.S. FISH AND WILDLIFE SERVICE POLICY

Ecological Services Instructional Memorandum No. 80 (U.S. Fish and Wildlife Service 1983) was intended to provide interim guidance on the mitigation banking concept that could be used as a framework in evaluating and developing bank proposals and, at the same time, allow maximum flexibility within the constraints of the FWS mitigation policy (U.S. Fish and Wildlife Service 1981). Considerations included in the Interim Guidance on Mitigation Banking to be addressed when the FWS is involved in banking include, but are not limited to, the following:

1. All losses must be unavoidable and necessary.

2. All onsite mitigation alternatives must be pursued first.

3. Property must be available and susceptible to mitigation banking requirements, including:

   a. ability to acquire the site by easement, fee title, or other legally-binding agreement;

   b. ability to manage the property for increased habitat values;

   c. ability to locate the bank within the same ecoregion, habitat type, and State as the impacts being mitigated.

4. "In-kind" mitigation is required for areas of high value to evaluation species and relatively scarce or becoming scarce on a National or ecoregion basis and is the first priority for habitat types of high to medium value for evaluation species and that are relatively abundant on a National basis.

5. Simple purchase of habitat is not mitigation banking unless "loss avoidance" can be unquestionably demonstrated. The extant habitat value of the mitigation site is not considered as bank credit.

6. Consideration should be given to establishing an interagency team to select and evaluate suitable candidate sites for the specific types of mitigation required. While developers may be considered as team members, they should not have veto authority or final approval of bank procedures.

7. The interagency team may also "manage" the bank; that is, approve "credits" and "withdrawals." If the team approach is not used, it is suggested that a third party, such as an organization primarily interested in public trust properties, be used as the "banker."

8. In no case will financial contributions to a trust fund for future land acquisition and management be considered as a mitigation bank.

9. Means for long-term operation and maintenance are to be agreed on before any area, facility, or improvement is accepted as a mitigation bank. For an action to be considered as a mitigation bank or bank "component," there must be agreement among all parties involved that the action increases habitat value in excess of the value occurring naturally during the life of the bank.

10. Areas managed or authorized to be managed by the FWS shall not be considered susceptible to mitigation banking without specific approval by the Director.

Nothing in the Interim Guidance on Mitigation Banking (U.S. Fish and Wildlife Service 1983) alters or supersedes FWS policies on other preservation or conservation plans or processes. Questions that arise relative to the mitigation banking concept are resolved in compliance with the FWS Mitigation Policy (U.S. Fish and Wildlife Service 1981). The FWS Mitigation Policy discusses four general categories of habitat and related mitigation goals,

based on relative abundance and value. Guidance on the applicability of banking to each of these categories of habitat was included in the Interim Guidance on Mitigation Banking (U.S. Fish and Wildlife Service 1983). Updated procedures for determining the appropriate habitat category were the subject of a memorandum from the Director to the FWS Regional Directors, dated 26 October 1987 (Dunkle 1987). This guidance was designed to ensure that determinations made by FWS personnel are supported by necessary ecological information and logical explanations of the resource values involved, as well as to designate the line manager responsible for such determinations. The four habitat categories and their applicability to mitigation banking are summarized below:

1. One-of-a-kind areas of high value to evaluation species and unique and irreplaceable on a National or ecoregion basis.

   Mitigation planning goal: No loss of existing habitat value.

   Applicability to mitigation banking: Mitigation banking is not an appropriate alternative.

2. Areas of high value to evaluation species and relatively scarce or becoming scarce on a National or ecoregion basis.

   Mitigation planning goal: No net loss of in-kind habitat value.

   Applicability to mitigation banking: Where unavoidable losses are likely to occur in permit situations, banking may be considered if habitat value losses can be replaced with gains in similar habitat values through creation or enhancement of similar systems or physical habitats; i.e., in-kind mitigation or replacement. Habitats must be in the same habitat type, same ecoregion, and same State as the impacts, and populations of fish and wildlife associated with the mitigation site are to be similar to those in the impact site.

3. Habitat types of high to medium value for evaluation species and that are relatively abundant on a National basis.

   Mitigation planning goal: No net loss of habitat value while minimizing loss of in-kind habitat value. If in-kind replacement is not desirable or possible, out-of-kind replacement is allowed. In this case, different types of physical habitats or systems are substituted or managed so that overall habitat value is replaced.

   Applicability to mitigation banking: Where unavoidable losses are likely to occur, banking may be considered if appropriate habitats are available and susceptible to banking. Habitats must be within the same ecoregion and the same State as the impacts.

4. Habitat types of medium to low value for evaluation species.

   Mitigation planning goal: Minimize loss of habitat value. Losses of these habitats generally will not have a significant adverse effect on important fish and wildlife resources. The FWS may make a recommendation for compensation depending on the significance of the potential loss.

   Applicability to mitigation banking: These lands provide the greatest flexibility for banks, as dissimilar mitigation activities may be acceptable in case of unavoidable losses. Habitats must be within the same ecoregion and same State as the impacts.

By early 1984, the FWS had been involved in implementing or planning 13 mitigation banks. On 15 May 1984, a memorandum was sent by the Director to the Regional Director (Assistant Regional Directors-Habitat Resources) stating that a detailed analysis of those 13 banks would be completed in the near future and that "It would be imprudent to enter into additional banking proposals until we have fully reviewed the 13 test cases" (Wallenstrom 1984). No new banking initiatives were to be started without Program Manager approval. Until now, no full review and evaluation of banks with FWS involvement has occurred and, as a consequence, no final FWS policy guidance on mitigation banking has been issued.

MITIGATION BANKS WITH U.S. FISH AND WILDLIFE SERVICE INVOLVEMENT

INTRODUCTION

Fifty-five potential mitigation banks were investigated by contacting over 60 FWS Field and Regional Office personnel. A total of 13 implemented banks with FWS involvement were identified. Table 1 presents a comparison between this list of 13 banks and the most recent published list, which contained 11 banks (Soileau et al. 1985). Two of the banks included by Soileau et al., the Port of Long Beach and the Port of Los Angeles, each involved implementation of two different banks, while the Port of Oakland and the Weyerhaeuser "banks" did not end up being implemented as mitigation banks. Two additional banks have been implemented, the North Dakota State Highway Department Mitigation Bank and the Company Swamp Mitigation Bank in North Carolina. There currently are banks in five of the seven operational FWS Regions. In addition to the 13 established banks, there are at least 10 potential banks in some stage of negotiation. A list of implemented and potential banks and the FWS contact for information about each is included in Appendix A.

The two most prevalent types of projects for which banks have been used are highways and port development, with five banks each (Table 2). The remaining three banks involve oil and gas exploration and industrial development, both permit and license activities, and a Federal Bureau of Reclamation water development project. Ten of the 13 banks have involved a fixed area of land, ranging from 11 acres to 9,523 acres, while the other three banks have no limit to the size of the bank and contain provisions for establishing additional credits on a project-by-project basis, usually with the concurrence of the parties to the banking agreement. Use of credits to date varies from banks with no remaining credits to banks that are so new that the activities required to establish credits have not yet occurred.

The 13 mitigation banks with FWS involvement are described and discussed below.

ASTORIA AIRPORT MITIGATION BANK

Bank Characteristics

Location: Clatsop County, Oregon

Size: 33 acres

Table 1. Comparison of current list of implemented banks with Service involvement with Soileau et al. (1985).

From Soileau et al. (1985)	Current inventory
Louisiana Department of Transportation and Development	Louisiana Department of Transportation and Development
Tenneco Oil Company	Tenneco LaTerre
Virginia Department of Highways and Transportation	Goose Creek
Minnesota Department of Transportation	Minnesota Department of Transportation
Bureau of Reclamation	Bonneville
Port of Long Beach	Pier J, Anaheim Bay Pier A, Newport Bay
Port of Los Angeles	PacTex, Batiquitos Lagoon Inner Harbor, Cabrillo Marina
Bracut Marsh	Bracut Marsh
Port of Oakland	Permit issues elevated to Washington Office; no bank involved
Port of Astoria	Astoria Airport
Weyerhaeuser	Not implemented as a bank
	North Dakota State Highway Department
	Company Swamp

Table 2. Summary of mitigation bank characteristics.

Bank name	Location	Sponsor	Size	Habitats	Type of projects for which bank will be used	Status	Region
Astoria Airport	Clatsop County, OR	Port of Astoria	33 acres	Brackish marsh	Port and harbor development, permits and licenses	10%-15% of credits used	1
Bracut Marsh	Humboldt County, CA	California State Coastal Conservancy	13 acres	Coastal wetland, riparian and upland habitat	Industrial development, permits and licenses	Some bank credits have been used	1
Port of Los Angeles - Inner Harbor, Cabrillo Marina	Inner Harbor, Port of Los Angeles, CA	Port of Los Angeles	No limit	Marine	Port development, permits and licenses	Additional bank credits can be established on a project-by-project basis	1
Port of Los Angeles - PacTex, Batiquitos Lagoon	Batiquitos Lagoon, CA	Port of Los Angeles	596 acres	Subtidal, unvegetated intertidal, salt and brackish marsh, freshwater marsh	Port development, permits and licenses	MOA signed November 1987; no bank credits established yet	1
Port of Long Beach - Pier A, Newport Bay	Newport Bay, CA	Port of Long Beach	29 acres	Subtidal and intertidal mudflats and saltmarsh	Port development, permits and licenses	Bank credits nearly all used	1
Port of Long Beach - Pier J, Anaheim Bay	Seal Beach National Wildlife Refuge, CA	Port of Long Beach	110 acres	Shallow water coastal embayments	Port development, permits and licenses	Restoration work to establish bank credits not completed to date	1

(Continued)

Table 2. (Concluded)

Bank name	Location	Sponsor	Size	Habitats	Type of projects for which bank will be used	Status	Region
Minnesota Dept. of Transport.	Statewide	Minnesota Dept. of Transport.	No limit	Freshwater wetlands	Highway projects, permits and licenses	Credits are maintained by highway district; only 2 of 7 districts have credit balance	3
Tenneco LaTerre	Terrebonne Parish	Tenneco Oil Company	7,014 acres	Fresh to brackish marshes	Oil and gas exploration, permits and licenses	$\leq$10% of bank credits used	4
Louisiana Dept. of Transport. and Development (LDOTD)	Grant and LaSalle Parishes, LA	Louisiana Dept. of Transport. and Development	2,944 acres	Forested wetlands (bottomland hardwoods)	Highway projects, permits and licenses	All base bank credits used	4
Company Swamp	Bertie County, North Carolina	North Carolina Dept. of Transportation	1,436 acres	Bottomland forest, gum-cypress forest	Highway projects, permits and licenses	Some bank credits have been used	4
Goose Creek	Chesapeake, Virginia	Virginia Dept. of Transport.	11 acres	Tidal coastal salt-marsh	Highway projects, permits and licenses	50% of bank credits used	5
North Dakota State Highway Department	Statewide	North Dakota State Highway Dept.	No limit	Wetlands with grassland buffers	Highway projects, permits and licenses	Additional credits can be established on project-by-project basis	6
Bonneville	Wasatch and Duchense Counties, UT	Bureau of Reclamation	9,523 acres	Sagebrush, aspen, woodland, conifer forest, and pinyon-juniper forest	Water development, Federal projects	All bank credits used	6

Development projects: Port and harbor development projects, and possibly other types of projects; all license and permit activities.

Bank life: In perpetuity.

Banking Agreement

A formal Memorandum of Agreement (MOA) was signed in October 1987 by EPA, FWS, NMFS, COE, the Oregon Department of Fish and Wildlife, the Oregon Department of Land Conservation and Development, and the Oregon Division of State Lands.

Interagency Team

An interagency team, consisting of personnel from the agencies that signed the MOA, serves as both a bank overview team and the HEP team in bank evaluation activities.

Bank Credit Establishment

The bank site consists of diked land, which is brackish marsh. A bank management plan, the Astoria Airport Habitat Development Plan, was developed in conjunction with the Columbia River Regional Management Plan. The Oregon Division of State Lands is responsible for conducting the habitat enhancement actions necessary to achieve the resource benefits identified in the HEP analysis. The bank site will be exposed to tidal inundation by breaching dikes; creating islands, ponds, and new tidal channels; and building a new dike to prevent flooding of the Astoria Airport.

Bank Land Ownership

The bank land currently is owned by the Port of Astoria and the Oregon Division of State Lands, although the title will be conveyed to the Oregon Division of State Lands upon construction of the bank. Bank land will be retained by the Oregon Division of State Lands in perpetuity for natural resource production purposes.

Evaluation Methodology

A modified HEP was used as the evaluation methodology and worked acceptably well.

Debit and Credit Procedure

Habitat-based bank credits were established at a level below that obtained by applying Oregon's State rating and above that obtained by applying HEP in order to balance Oregon's emphasis on estuarine resources with Federal consideration of wetland environments in general. The bank was established at 80 credits, with the Oregon Division of State Lands maintaining the balance sheet for transactions.

No debits or credits can be applied to the bank until all MOA signators concur with the Oregon Division of State Lands data sheet analysis. The Oregon Division of State Lands prepares an annual summary report of bank transactions and provides copies to the parties signing the MOA. There are several restrictions on credit use:

1. The bank is for use for projects that have been approved in the State and Federal permitting process and found to be consistent with the Oregon Coastal Zone Management Plan.

2. Each eligible project must have been reviewed to eliminate all but unavoidable and necessary losses, and all measures must have been taken to minimize or eliminate impacts prior to consideration of bank use. Prior to use of the bank, mitigation at the project site must be explored and used to the maximum extent practicable.

3. The bank can only be used for approved projects within the Columbia River estuary.

4. Some credits are set aside for mitigating port and harbor development impacts; remaining credits are available to other applicants.

5. The bank is available for projects that require mitigation, are otherwise approvable under Oregon's Removal-Fill Law (ORS 541.605 - 541.695) and COE permit requirements under Section 10/404, and have met the impact elimination and reduction requirements.

6. Only projects involving unavoidable and necessary impacts and approved under the local comprehensive plan are eligible for debiting the bank.

7. The bank is available for projects only when onsite mitigation is unavailable or when onsite mitigation only partially mitigates for project impacts.

8. The bank is available to all projects between the tip of Tongue Point to the west bank of the Skipanon River along the Oregon side of the Columbia River estuary.

9. Mitigation requirements for proposed projects are determined by Oregon Division of State Lands Mitigation Rules OAR 141-85-240 through 141-85-258.

The Oregon Division of State Lands habitat relative value system (OAR 141-85-266) is used in withdrawing credits. The price for each credit (1 acre of habitat with a relative value of 1.0) is $3,000.

Bank Activity to Date

There has been one debit for 10.59 of the 80 bank credits.

Monitoring and Evaluation

This bank is considered a pilot project, and provisions were made to adjust the available credits if the predicted number is not substantiated by later monitoring and evaluation. The Oregon Division of State Lands will convene an interagency review of the site and conduct a complete evaluation of the bank using HEP or some other mutually agreeable and credible methodology after 5 years. Other complete evaluations are planned 3 to 5 years after significant operational or structural changes.

Background

The Columbia River is the largest river on the Pacific coast. More than 43% of the tidal marshes and 76% of the tidal swamps have been lost since 1885, mostly due to diking. The morphology of the estuarine systems along the Oregon coast makes them susceptible to human alteration, with diking for agricultural uses far outweighing filling as the primary factor leading to wetland losses. Most of the conversions to agriculture occurred prior to the 1930's and account for approximately 90% of the documented habitat losses. Estuarine wetland losses since then are primarily attributable to urban activities such as wetland filling to create port facilities and discharging dredged material to maintain access to port facilities. Additional contributors to the loss of wetland habitats within estuarine systems include increased sedimentation due to extensive logging and other activities.

There has been a significant loss of tidal swamp and high marsh in the Young's Bay estuary, and the diking that has occurred has created some freshwater wetlands with resource value. Cumulative impact data were used by the Oregon Division of State Lands to justify banking the swamp, brackish marsh, and channel habitats that would be created. Obtaining funding for the implementation of mitigation banks has been a problem in this geographic area. The Astoria Airport Mitigation Bank used Federal funds that are no longer available.

Discussion

The Astoria Airport Mitigation Bank has been an important example of the fact that a bank can be established and provide mitigation. Implementation of the bank also has helped improve working relationships and communication among the involved agencies and the Port of Astoria. Although it is too early to determine how effective the bank will be, other developers have proposed additional banks, which could potentially help preserve wetlands in the area.

In some cases, the bank is giving other developers the idea that development can occur anywhere in wetlands as long as they have first established a bank. It will require vigilance to keep developers from perceiving banks as

mechanisms to ensure blanket approval for future permit applications and to make sure there is no reduction in the quality of project planning in terms of the least damaging alternative and onsite mitigation possibilities.

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BRACUT WETLAND MITIGATION MARSH

Bank Characteristics

Location: The Bracut Wetland Mitigation Marsh is located in Humboldt Bay, Humboldt County, California. The Bay is about 5 miles northeast of the city of Eureka. The bank site is about 1 mile south of Jacoby Creek and is contiguous with a FWS National Wildlife Refuge.

Size: 13 acres.

Development projects: Industrial development; permit and license activities.

Bank life: The dedicated life of the bank is until the credits are used up, although the bank site is to be held and managed in perpetuity.

Banking Agreement

This bank was implemented in 1981 to offset wetland losses within the city of Eureka, but the status of a formal banking agreement is unclear.

There may have been a Memorandum of Understanding (MOU) signed by the California State Coastal Conservancy, the California Coastal Commission, and, possibly, the California Department of Fish and Game.

Bank Credit Establishment

The bank area is diked former tidelands (bayland) and consists of 6 acres of coastal wetlands and 7 acres of riparian and upland habitat. The California State Coastal Conservancy was responsible for carrying out the bank implementation measures, which consisted of restoring tidal action to the area. The bank site was a former tidal marsh on the Humboldt Bay shoreline that had been filled and used as a lumberyard. The wetland was created by breaching a dike after excavating and recontouring the area that had been filled with gravel, earth, and wood debris. The site plan also called for riprapping the outer levee and planting marsh vegetation. The bank site provides habitat for three endangered plant species.

There was a formal bank management plan, developed by the California State Coastal Conservancy in relation to a regional plan, concerning the Bracut Marsh Wetlands Restoration Project. Representatives from Humboldt County, the cities of Arcata and Eureka, the California Coastal Commission, the Humboldt Bay Harbor Recreation and Conservation District, and State and Federal resource agencies, formed a working group to identify regional wetland restoration goals and to determine the number of acres of each type of existing wetland designated for coastal-dependent development, which is the only kind of wetland development allowed under the California Coastal Act. The conclusion of the working group was that sites most suitable for enhancement as mitigation banks were those that could provide compensation for projected habitat losses, would meet as many regional restoration goals as possible, and were marginal agricultural lands that would not affect the local agricultural economy if they were restored to wetlands. Most of the marshes in the Humboldt Bay area have been diked and drained for agricultural uses, and there are few available vacant areas of filled former wetlands. In addition, the California Coastal Commission and the California State Coastal Conservancy developed the "Broadway Wetlands Restoration Conceptual Plan" to help resolve controversy surrounding filling small pocket marshes in one of Eureka's partially developed industrial waterfront areas on the Bay.

Bank Land Ownership

The bank land is owned by the California State Coastal Conservancy, which also is responsible for long-term bank management.

Debit and Credit Procedure

Mitigation actions were identified in advance, based on projected wetland losses by type and acreage. Developers contribute toward the cost of acquiring the bank lands and improving the habitat, thus freeing up State funds for further land acquisition. The owners of four Broadway pocket marshes were assigned priority in the use of bank credits, with the remaining credits

available to other applicants in the Humboldt Bay area on a first-come, first-served basis. Pocket marshes (marshes no more than 2 acres in size) are considered to have importance to migratory waterfowl and waterbirds.

When a pocket marsh is to be filled, the area of habitat that will be lost is determined. The permit applicant "buys" mitigation credits at 75¢/ft² from the California State Coastal Conservancy to compensate for the losses. The mitigation rate cannot be less than 1 ft² of restored marsh for each square foot of filled marsh. Payment was fixed as a pro rata share of the Conservancy's cost to complete the Bracut Marsh Wetlands Restoration Project.

Bank Activity to Date

The bank has been used to mitigate four pocket marshes and other small wetland fills for a total of approximately 2.5 acres.

Monitoring and Evaluation

In May 1987, a field study of the bank was conducted to evaluate the physical and biological characteristics of the site. The study included recommendations for improvements within the wetland. Problems found during the study included the following:

1. The northern portion of the bank site has a hard surface that tends to retain water within shallow tidal pools.

2. Wood debris at the site is producing methane gas.

3. A sill of riprap at the dike breach retains water within the marsh at lower elevations.

4. Decay of wood debris contributes to poor water quality in pools during low tide.

5. Islands created in the southern portion of the area have a low soil pH, which contributes to sparse vegetation of low diversity.

6. Poor soil conditions contribute to patchy vegetation distribution throughout the area.

The study found that a number of important habitats had been established within the bank, including tidal pools in the northern portion and freshwater/brackish water wetland in the southeastern portion, and that benthic invertebrates were relatively abundant throughout the site. Habitat improvement recommendations included removing the sill at the dike breach, excavating the tidal channels to improve drainage, and reducing the elevation of the islands to alleviate acidic soil problems.

Background

The Bracut Wetland Mitigation Marsh was implemented to offset wetland losses within the City of Eureka. The filled wetlands were a series of pocket

marshes within an industrial area of the city. Pocket marshes are areas that have been isolated from tidal action by past development projects, have low value because of their small size and isolation, and cannot be restored as functioning marshes. The Bracut site, which had been filled and used as a lumberyard, was chosen as the most appropriate site to establish a single, relatively large wetland to replace the pocket marshes.

Wood debris in the fill material was a serious problem with this site because of the possibility that it would float after excavation. An additional concern was that the soil was too compacted to be suitable for marsh plant growth. The proposed solution was to create islands with imported bay mud to provide suitable substrate for marsh plants.

Discussion

Because of the unique nature of the soil conditions in an area formerly used as a lumberyard, it was not possible to predict the success of the mitigation project in terms of production and habitat quality. A number of problems have occurred with the bank, including a substantial amount of wood debris floating to the surface and drifting out into Arcata Bay, slow and poor establishment of marsh plants, a hard gravel surface in some parts of the bank that has remained largely barren, an unexpected distribution in marsh vegetation, and the presence of hydrogen sulfide gas in some of the tidal channels. Bird use of the bank site has not been as great as predicted, and the area is not being used for nesting or breeding activities. Although few of these problems have been quantified, there is concern over how successful the bank has been in providing suitable habitat replacement for wetland sites that have been lost.

The bank has provided a learning experience, in terms of restoration and revegetation of wetland sites, even though habitat values do not appear to have been established as anticipated. Some of the problems with this bank might have been corrected earlier had there been monitoring from the first, rather than waiting 6 years to evaluate changes in the bank lands.

Sources

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PORT OF LOS ANGELES - INNER HARBOR, CABRILLO MARINA MITIGATION BANK

Bank Characteristics

Location: Inner Harbor, Port of Los Angeles, California.

Size: No limit.

Development projects: Port development; permit and license activities.

Bank life: Until all bank credits are used or bank is rescinded.

Banking Agreement

A MOU was signed in October 1984 by the City of Los Angeles Board of Harbor Commissioners, the FWS, the California Department of Fish and Game, and the NMFS. The MOU will remain valid until the balance of created habitat value has been used up, unless rescinded by written consent of all involved parties.

Evaluation Methodology

The evaluation methodology involved determining the net gain or loss in total water surface acreage that had occurred as the result of numerous Section 404 port development projects involving either excavation or removal of existing fill or areas in the harbor that were filled. Creation of new water area by excavation is considered equal in habitat value to water area losses resulting from fill when the water surface area, measured at mean high water level (+4.8 ft mean lower low water), is equal. That is, water areas of equal surface acreage are considered to have essentially equal habitat value. The net change within the Harbor District since June 1975, when the Section 404 permit program started, is established in the MOU as a net gain of 17.7 acres, which constitute the beginning bank credits. Additional credits can be assigned on a project-by-project basis for increased marine habitat values associated with harbor development projects that create new water surface area, but only when approved by all the involved parties.

Harbor Board projects likely to create or eliminate water surface area in the harbor are listed in the MOU, although projects may be deleted or added with the written consent of all parties. Projects with the potential to affect State or Federal endangered species or that are outside the Harbor District boundaries cannot be considered under the MOU. The Harbor Board can allow use of previously created habitat value as compensation by others proposing a landfill in the Harbor District. Similarly, habitat values can accrue from excavation when there has been prior approval of the Board and written consent of all involved parties and the authorized person or entity is an applicant for a COE permit.

The Port of Los Angeles is the only user of bank credits, and credits can only be used for projects within Harbor District boundaries. Projects debited against bank credits must be necessary, the minimum possible, water-dependent and port-related, and agreed to by all parties. Agreement to use existing

credits to offset project losses is to be indicated, in an official and public manner, at the earliest appropriate opportunity by all parties during completion of the environmental review process required under the California Environmental Quality Act or NEPA and the regulatory process required under the California Coastal Act or the Section 10/404 permit process. No harbor landfill proposed to be debited against the bank can exceed the balance of previously created habitat value.

Background

The City of Los Angeles is represented by the Board of Harbor Commissioners in the formal agreement associated with this bank; the Board of Harbor Commissioners is responsible for overseeing the development of the Port of Los Angeles. Port development landfills are subject to both Federal Section 10/404 regulations and the California Coastal Act. The bank was established to facilitate permit processing and ensure mitigation for contemplated small Harbor District projects involving either landfills that permanently eliminate marine habitat or excavations that create marine habitat.

The Los Angeles Harbor District is part of the 6,000-acre marine coastal embayment known as San Pedro Bay, which is semienclosed by 9 miles of breakwater. The highly productive, relatively shallow, marine, semienclosed, coastal embayments in California have been modified and greatly diminished in extent during the last century. San Pedro Bay provides high fish and wildlife habitat value that is scarce in the region. The Los Angeles Harbor is a major commercial port. Water depths are mostly greater than 20 ft, the shoreline is mostly protected with rock or bulkheads, and land uses are urban and industrial. Fish populations are abundant and rich, and the area acts as a nursery for a variety of coastal marine fishes. About 150 species of migratory birds use the area. The Port of Los Angeles and its facilities are considered an essential element of the maritime industry, a vital strategic facility in the National defense system, and a significant positive influence on both regional and National economies, as well as a primary California coastal resource.

Sources

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PORT OF LOS ANGELES - PACTEX, BATIQUITOS LAGOON MITIGATION BANK

Location: Batiquitos Lagoon, San Diego County, California

Size: 596 acres

Development projects: Originally designated to mitigate for the impacts of the Pacific Texas Pipeline and Transportation Company (PacTex) landfill in the Port of Los Angeles, with excess mitigation credits to be used for future fill projects in San Pedro Bay; permit and license activities.

Bank life: The bank is dedicated in perpetuity unless otherwise rescinded by written consent of all parties or cancelled as per conditions of the MOA.

Banking Agreement

An MOA was signed in November 1987 by the City of Los Angeles, acting by and through its Board of Harbor Commissioners, the FWS, the California Department of Fish and Game, the NMFS, the City of Carlsbad, and the California State Land Commission.

Bank Credit Establishment

The draft bank management plan, the "Batiquitos Lagoon Enhancement Plan," contained four alternative plans for the project, with the recommendation that the first alternative presented in the draft plan be selected for implementation. The plan was designed to provide an opportunity to develop an enhancement project for the Batiquitos Lagoon that would meet the goals of the interest groups, offset PacTex project impacts, and create excess habitat value for future fill projects in San Pedro Bay. The EIR/EIS for the project is now in preparation, and the actual project to be implemented at the Batiquitos Lagoon will be the one identified in the final EIR/EIS, following public input. The actual physical "product" of construction will determine the number of available habitat credits. Lagoon enhancement goals are to:

1. restore tidal influence to the lagoon;
2. retain existing marshland and create additional marshland, if desirable;
3. preserve or enhance existing fish and wildlife resources;
4. retain and enhance habitat for endangered species;
5. maintain good water quality;
6. provide public access to the lagoon shoreline, where appropriate;
7. reduce sedimentation in a cost-effective manner;

8. maintain an open ocean entrance; and

9. ensure that the goals listed above are achieved and maintained in perpetuity.

Under Alternative One, the cover types that will be established at the bank site include 220 acres of subtidal habitat, 170 acres of unvegetated intertidal habitat, 139 acres of salt/brackish marsh, 33 acres of freshwater marsh, and 34 acres of least tern nesting habitat. The California least tern has nested in several areas within the lagoon and is both a State and Federal endangered species.

Bank Land Ownership

The City of Carlsbad was considered the most appropriate agency to obtain the necessary property rights and to design and construct the bank site. After the City of Carlsbad obtained the lagoon property by permanent easements or fee title, it was transferred to the California State Land Commission. Although the State Land Commission will hold the property rights, it will lease the property to the California Department of Fish and Game for the maximum period allowed by law to facilitate management and long-term maintenance of the project.

Evaluation Methodology

The FWS, the NMFS, the California Department of Fish and Game, and the Port of Los Angeles agreed to use an evaluation team of biologists from the involved agencies. The evaluation team had a number of responsibilities, including: (1) determining the proposed project scope and fish and wildlife resources likely to be significantly impacted; (2) establishing mitigation goals; (3) defining harbor cover types; (4) establishing the mitigation site; (5) developing the conceptual design of mitigation area construction and the list of harbor and mitigation site evaluation species; and (6) determining the habitat suitability indices for project and mitigation alternatives, the habitat units for the project area and alternative mitigation areas, the necessary size of the mitigation area needed to offset the proposed project, and the potential bank credits available to offset future fill projects in San Pedro Bay for each alternative.

The lagoon enhancement project is to result in no net loss of habitat value for shorebirds, dabbling ducks, and endangered California least terns. Cover types and 20 evaluation species or groups of species were selected for the proposed landfill site and the alternative enhancement sites; the evaluation species chosen were either the same at the fill and compensation sites or considered ecologically equivalent. Habitat suitability indices were determined by the judgment of the evaluation team members and then averaged. Separate evaluations of existing habitat for shorebirds, dabbling ducks, and least terns were conducted by the FWS and the California Department of Fish and Game based on the decision that the Batiquitos Lagoon restoration project must conserve existing habitat values for these species.

Habitat units per acre were calculated by summing the mean habitat suitability indices. Habitat unit gains and losses for the evaluation species were the units of measure and were exchanged on a unit-by-unit basis. A basic premise was that fishery resources would not be traded for avian resources and vice versa. The net result of comparing the anticipated habitat unit losses at the PacTex landfill with the habitat unit gains at Batiquitos Lagoon was represented in a ratio that indicates the offset requirements; the trade-off ratio for Alternative One is 1.138. There are 390 acres in the lagoon available for restoration. Lagoon habitat gains were expected to compensate for the 118.8-acre PacTex and could provide an additional 83 to 325 restored acres for use in offsetting future landfill projects in San Pedro Bay or other appropriate port districts.

Debit and Credit Procedure

The parties to the MOA agreed that habitat values gained from the lagoon enhancement project would be used to mitigate habitat values lost with the PacTex landfill and for other landfill projects permitted in the future. Excess habitat units will be credited to the Harbor Board for future projects associated with development of new terminal facilities for general cargo, bulk and neobulk cargo, and necessary supporting infrastructure that receive all required Federal and State permits.

Each acre of habitat filled in water -20 ft mean lower low water will be completely offset by 1 acre of excess habitat, subject to any permit conditions imposed by regulatory agencies on the future landfill projects. The applicability of using excess habitat units must be reevaluated and approved by the FWS, the NMFS, the California Department of Fish and Game, and the Harbor Board for dredge or fill projects in the Harbor District in shallower water, including areas classified as rocky dike habitat, or for land uses not referenced in the MOA. No bank credits can be used for any purpose until construction certification has been obtained.

The Harbor Board can transfer excess credits to other ports in the Southern California Bight that are applicants for a COE permit or a California Coastal Development permit if: (1) the transfer is approved by the FWS, the NMFS, the State Land Commission, and the California Department of Fish and Game; (2) the credits will be used only to compensate for port district project losses in waters deeper than -20 ft mean lower low water; and (3) where transfer and use of excess habitat units will not result in a net loss of fish and wildlife values. Bank credits cannot be used as mitigation for projects that fill or otherwise adversely impact wetlands, as defined by Cowardin et al. (1979).

Background

A major port expansion project was planned in the Port of Los Angeles to meet the needs of PacTex, whose pipeline would carry oil from west coast States to refineries in Midland, Texas. This bank is an example of how a large economically and politically important development project can serve as a catalyst for bank establishment. The PacTex project and associated mitigation were on an accelerated schedule. One of the top priorities in

mitigation site selection was the speed with which a mitigation enhancement plan could be developed and implemented. Batiquitos Lagoon was selected, in part, because the California Coastal Conservancy had previously done preliminary research and design on the lagoon as a mitigation site.

The California Department of Fish and Game was to manage and maintain the Batiquitos Lagoon site with funds provided by PacTex and the Port of Los Angeles. PacTex agreed to establish an annuity fund of up to $20 million to cover estimated maintenance costs for the first 30 years after project construction. The PacTex landfill project was not to start until the first $15 million had been deposited into the escrow account. After depositing up to $20 million in the escrow account, PacTex would have no further mitigation obligation for fish and wildlife habitat losses resulting from this landfill project, except as provided for in the COE permit. The Port of Los Angeles would, at the same time the PacTex annuity fund was set up, establish an interest-bearing investment account that would be available to the California Department of Fish and Game at the end of the first 30-year period. If interest rates did not decrease, a multimillion dollar fund was expected to be available to maintain the lagoon in perpetuity.

The FWS, the NMFS, and the California Department of Fish and Game agreed that compensation for harbor landfills, such as the PacTex project, should emphasize the creation of shallow water, coastal embayment habitat because it has a relatively high value for marine fishes and migratory birds and has been reduced in area at a greater rate than has deep water habitat. The City of Carlsbad has jurisdiction over the lagoon and much of its watershed area and wants to expedite lagoon enhancement. The lagoon is a 596-acre elongated coastal basin that extends approximately 2.5 miles inland and is 0.5 miles in width. There has been a substantial reduction in tidal volume due to sedimentation, particularly within the last quarter century. There has been a rapid increase in sedimentation recently, and the lagoon mouth has become closed to tidal influence except under extreme high tide and wave conditions or high outflows. Seasonal freshwater inflow and elimination of tidal influence have resulted in fresh or brackish water inundation after winter rains, with subsequent evaporation during the dry season resulting in high salinities and large salt flats. Large areas of the lagoon dry up completely in dry years, resulting in bare salt flats and related odor problems. The lagoon biota largely is limited to plankton and insects, with fish found only in the deeper waters of the western lagoon and San Marcos Creek. The evaluation of enhancement alternatives for the lagoon has occurred over several years by property owners, resource agencies, local citizen interest groups, and the City of Carlsbad. Areas of the lagoon that would be enhanced have little habitat value for the marine evaluation species in their present condition.

Discussion

There was considerable controversy surrounding this mitigation project because PacTex, a venture capital outfit, attempted to manipulate the decisionmaking process and pushed for "checkbook mitigation" in the form of *in lieu* payments. In addition, the Batiquitos Lagoon was 60% owned by the Hunt Brothers Company, whose agents tried to hold the Lagoon "hostage" to approval

of their upland development plans. They have since transferred lagoon ownership and sold their upland properties. Another concern was the use of a mitigation site in San Diego County to offset project impacts in the Port of Los Angeles, a distance of over 50 miles from the impact site.

The planned PacTex project was not implemented. As called for in the banking agreement, the Port has assumed responsibility for all costs associated with bank establishment.

Sources

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PORT OF LONG BEACH - PIER A, NEWPORT BAY MITIGATION BANK

Bank Characteristics

Location: The bank is located in the Upper Newport Bay Ecological Reserve (UNBER), City of Newport Beach, Orange County, California.

Size: 29 acres.

Development projects: Port development; permit and license activities.

Bank life: The bank MOU will remain valid until the balance of credits has been used or until the MOU is rescinded by written consent of all involved parties.

Banking Agreement

The MOU was signed in March 1984 by the Board of Harbor Commissioners of the City of Long Beach, the California Department of Fish and Game, the NMFS, and the FWS.

Interagency Team

The MOU signators function as the interagency bank overview team.

Bank Credit Establishment

The bank site includes scarce subtidal and intertidal mudflats and salt-marsh and is a estuarine embayment of high value to coastal marine fishes and migratory birds. Habitat improvement measures used to establish credits involved restoration, including some dredging, of tidal influence to a predominantly barren, superlittoral area (Area A) of degraded salt marsh habitat in the "old salt ponds" region of the UNBER. The restored area is a shallow, protected embayment that provides shoreline habitat and critical nursery habitat for marine fish and shellfish of commercial and recreational importance. The Board of Harbor Commissioners was responsible for carrying out the bank enhancement measures, at its cost, on the 21.021 acre Area A. The Board also exercised its option of restoring the additional 7.06 acre Area B. The Board was responsible for all aspects of the restoration work, although the FWS, the NMFS, and the California Department of Fish and Game cooperated with the Board and assisted procedurally with permit and approval acquisition and locating a dredge spoil disposal site outside the UNBER.

Five State or Federal endangered species make significant use of San Pedro Bay, where UNBER is located: California brown pelican, light-footed clapper rail, California least tern, Belding's savannah sparrow, and salt marsh bird's beak.

Bank Land Ownership

The bank site is owned and managed by the California Department of Fish and Game; the Board of Harbor Commissioners had no responsibility for maintaining or monitoring the restored area once enhancement was completed and certified acceptable.

Evaluation Methodology

A "consensus habitat evaluation," using available biological inventories, was done by biologists from the FWS, the NMFS, the California Department of Fish and Game, and the Port. The evaluation process was somewhat analogous to HEP, although HEP was not literally used because of the absence of species models for the appropriate marine and estuarine species, lack of non-FWS personnel trained in HEP, and lack of time and funds to meet either one of these needs. The evaluation methodology worked acceptably well for the bank.

The UNBER and Long Beach Harbor are about 25 miles apart and share many common fish and bird species, although total species lists and population sizes are somewhat different. Available information concerning bird and fish sampling data, shared species, common biological functions, productivity, fish nursery functions, ecosystem physiography, and areal extent were used to establish the relative habitat value of the harbor waters slated for filling versus the estuarine area to be restored. Two planning aid reports were prepared by the FWS for the COE Los Angeles District (June 1981 and September 1983) based on these comparisons of habitat value as part of the Los Angeles-Long Beach Harbor Long-Range Planning Project. Both San Pedro and Newport Bays provide high habitat value for their related fish and wildlife resources and are scarce in extent in the region.

Debit and Credit Procedure

Bank credits were to be used to offset losses in marine habitat from port development landfill projects in the Harbor District, as agreed to by involved parties during completion of the environmental review process required under the California Environmental Quality Act and/or the regulatory process associated with the California Coastal Act, the Rivers and Harbors Act, or the Clean Water Act. The UNBER restoration work had to be inspected and certified complete by the Chief Harbor Engineer of the Harbor Department of the City of Long Beach and the California Department of Fish and Game and approved by the FWS and the NMFS before any credits could be charged or contemplated landfills placed. The MOU contained a list of the planned Board landfill projects likely to consume the bank credits. Other Board landfill projects can be added or deleted with the written consent of all involved parties. Landfill projects outside the Harbor District cannot be charged against bank credits.

Bank Activity to Date

The mitigation bank had a total of 31.53 credits or 1.5 habitat units per acre for Area A. An additional 10.59 credits were associated with restoration and inspection of the other 6.06-acre area. Credits were specifically intended to mitigate a 1.6-acre fill at Berth 83 and a 24-acre fill at Pier A, with the balance for other projects. Bank credits are nearly used up at this time; the few remaining credits will be applied to mitigation needed for the Pier J project not covered by the Port J (Port of Long Beach-Pier J, Anaheim Bay) mitigation bank.

Monitoring and Evaluation

Biological monitoring of birds, benthic invertebrates, and fish has been conducted.

Background

Long Beach Harbor, like Los Angeles Harbor, is a major commercial port and occupies part of the 6,000-acre marine coastal embayment known as San Pedro Bay, which is semienclosed by 9 miles of breakwater. Fish populations in the bay are abundant and diverse, and the area acts as a nursery for a variety of coastal marine fishes. About 150 species of migratory birds use the bay area, with an estimated 840,000 bird-use-days annually. It is predicted that there will be about 2,600 acres of new landfills in Long Beach and Los Angeles Harbors over the next several decades.

The habitat tradeoff agreement formalized in the MOU was the fourth attempt, over a several-year period, to determine an appropriate habitat loss compensation measure for the contemplated fill at Long Beach Harbor Berth 83 and a mitigation bank for future port development projects. The first attempt involved trying to design within-port projects that balanced cut and fill so the net area of marine habitats remained unchanged. This type of balancing proved practical only for a few, relatively small projects. Within-port mitigation is further complicated by the Port's prediction that additional landfills will be needed to support port functions. It was thought possible

that establishing a mitigation area within a developing port could either prevent or impede future necessary port development projects or else be threatened with destruction by later port landfills.

The second attempt to define an acceptable mitigation measure was a proposal to restore tidal influence to a 16-acre parcel of diked historic coastal wetland in the city of Huntington Beach in Orange County. However, the necessary change in property rights to accomplish the mitigation work could not be accomplished and the attempt was abandoned. The third attempt involved constructing an artificial reef in San Pedro Bay. This mitigation measure was considered impractical at the time because of uncertainty about the net biological "improvement" that would result from the artificial reef.

When the FWS, the NMFS, and the California Department of Fish and Game reanalyzed restoration of coastal wetland as a port mitigation measure, they considered nearness of the restorable site to the loss area, technical feasibility of tidal restoration, willingness of the land owner, and ecosystem and fish and wildlife resource similarity; the Newport Bay site was considered the most feasible option. At that time (May 1984), the California Department of Fish and Game anticipated receiving substantial State funds for additional restoration work in the 741-acre UNBER, which occupies about half of the Newport Bay Estuary and is managed by the Department. The interagency team reviewed the advantages of combining the Port of Long Beach mitigation bank with the larger State-sponsored project, both of which involved UNBER enhancement projects.

The opportunity to combine the two UNBER enhancement projects was considered a unique situation and one where habitat benefits could be maximized because: (1) the economy of scale of excavation work would be increased, allowing more sediment to be removed from the bay; and (2) the prospective contractor would have more options for carrying out the projects, which should result in cost savings. The savings would maximize the amount of sediment that could be removed, which would increase fish and wildlife benefits.

The UNBER consists of cord grass and pickleweed-dominated salt marsh, intertidal mudflats, and shallow subtidal estuarine channels. The UNBER supports 78 species of fish, a nursery function for a variety of coastal marine fishes, and about 159 species of migratory birds. Four million annual bird-use days have been estimated. In southern California, coastal embayments, such as Newport Bay, have been modified and greatly diminished during the last 100 years. Within Los Angeles and Orange Counties, approximately 90% of the area of river and creek mouth lagoons and their wetlands have been filled and developed.

The UNBER restoration site was a largely barren floodplain area above the reach of the tides and offered minimal habitat value. Involved fish and wildlife agencies helped the port plan the UNBER restoration project, including site configuration, timing, and manner of construction, to avoid adverse impacts to the UNBER ecosystem, particularly the endangered species it supports. Habitat improvement at the restoration site would be virtually 100% for both fish and waterfowl.

In order to combine Port and California Department of Fish and Game projects without impacting the project schedule, the Port was allowed to deposit the funds necessary for the restoration project in an interest-bearing account held by the City of Newport Beach. The commitment to carry out the Port's restoration project also was transferred to the City of Newport Beach. Any monies in excess of actual restoration project expenses were to be used to restore additional wetlands in Upper Newport Bay. Once the Port's check was deposited in the city's account, the Port's responsibilities for restoration were fulfilled and the habitat credits accrued immediately.

Discussion

From a FWS perspective, implementation and use of this bank have gone well, resulting in greater resource enhancement than would have been possible otherwise. On the negative side, the bank was established on land that was already protected. Absence of mitigation banking guidance or policy within the NMFS and the California Department of Fish and Game resulted in inconsistency and delays, and finding a suitable location for the bank proved difficult.

Sources

Anonymous. 1984. Memorandum of Understanding between the Board of Harbor Commissioners of the City of Long Beach, the California Department of Fish and Game, the National Marine Fisheries Service, and the U.S. Fish and Wildlife Service to establish a procedure for advance compensation of marine habitat losses incurred by port development landfills within the Harbor District of the City of Long Beach. 7 pp + exhibits.

Fancher, J. U.S. Fish and Wildlife Service, Federal Building, 24000 Avila Road, Laguna Niguel, CA 92656. Pers. comm. 11 December 1987.

PORT OF LONG BEACH - PIER J, ANAHEIM BAY MITIGATION BANK

Bank Characteristics

Location: The three mitigation bank parcels are in the Seal Beach National Wildlife Refuge, located within the Seal Beach Naval Weapons Station, Orange County, California.

Size: Approximately 110 acres.

Development projects: Port development landfills; permit and license activities.

Bank life: The MOU will remain valid until bank credits are consumed or the MOU is rescinded by written consent of all involved parties.

Banking Agreement

A formal agreement was signed in February 1986 by the City of Long Beach Board of Harbor Commissioners, the FWS, the California Department of Fish and Game, and the NMFS.

Bank Credit Establishment

Habitat enhancement measures taken to establish bank credits will involve creating tidally influenced wetland and water habitat out of "woody uplands" of low habitat value in three specified areas in Anaheim Bay and the northern and northeastern region of Seal Beach National Wildlife Refuge. Specific actions include restoration of tidal influence with some slope and islands, construction of at least six mounds on each island, and putting culverts under existing roadbeds to provide permanent unimpeded flushing of each parcel by tidal waters. Mounds on the islands are nesting locations for the endangered light-footed clapper rail. Other endangered or threatened species that use the Seal Beach National Wildlife Refuge are California least tern, California brown pelican, Belding's savannah sparrow, and salt marsh bird's beak.

The Board of Harbor Commissioners is responsible for all aspects of the restoration work, including its cost. The FWS, the NMFS, and the California Department of Fish and Game will assist the Board in acquiring necessary approvals and permits for the restoration work and locating an appropriate dredge spoil disposal site. Restoration work at the Seal Beach National Wildlife Refuge is to be conducted in accordance with a FWS Refuge Use Permit and with the approval of the Commander, Seal Beach Naval Weapons Station, subject to a U.S. Navy Siting Approval. Restoration work is to be scheduled and completed in a manner to minimize significant habitat loss or degradation elsewhere in the Refuge and to avoid adverse impacts on State and Federal endangered species that use the Refuge. Construction work on the mitigation bank site is scheduled to begin in late 1988.

Bank Land Ownership

The mitigation bank is located on National Wildlife Refuge land about 6 miles from the Pier J landfill site. Although the land around and within the Seal Beach National Wildlife Refuge is owned by the U.S. Navy, the Refuge was created by Congress and is managed by the FWS. The Board of Harbor Commissioners will have no responsibility for maintenance or monitoring of the area on the Refuge once restoration has been completed; the FWS determined that operation and maintenance of the bank site would not significantly add to present management costs for the Refuge.

Evaluation Methodology

The evaluation methodology used was a modification of HEP80, applied by an evaluation team of biologists representing the parties that signed the MOU. Pertinent species models were unavailable, and preparation of species models

infeasible. The evaluation did not include candidate, proposed, or listed threatened or endangered species. There were several steps in the evaluation process:

1. Determination of the proposed project scope and the fish and wildlife resources likely to be significantly impacted.

2. Establishment of mitigation goals.

3. Identification of the compensation site and conceptual design of compensation site construction.

4. Development of the list of harbor evaluation species and the list of compensation site evaluation species.

5. Formulation of project and compensation site habitat suitability indices and habitat units. Relative value indices were not used, and a 50-year evaluation period was chosen.

6. Determination of the necessary size of the compensation area.

Twenty evaluation species or groups were selected. Comparison of habitat changes with and without the Pier J landfill and with and without the Anaheim Bay restoration indicated a need for 102.5 restored acres at Anaheim Bay to offset the Pier J loss. Habitat unit gains and losses for the evaluation species are the units of measure and are exchanged on a unit-for-unit basis. Each acre at Pier J that is filled requires 0.759 acres restored at Anaheim Bay to offset the loss. Each additional acre restored at Anaheim Bay will provide 12.96 habitat units for the 20 evaluation species.

Debit and Credit Procedures

The first 102.5 acres restored at Anaheim Bay are intended to offset the predicted habitat loss for fish and migratory birds at the 135-acre Pier J landfill. The Board has the option, with FWS approval, to restore additional acres, which would create excess habitat value units that would be credited to the Board and could be used to offset losses from other port development landfill projects when all the parties to the MOU agree. If the refuge restoration work is completed but the Pier J landfill does not occur, all habitat value gains will be considered excess and credited to the Board.

Pier J landfill construction cannot begin until construction of the refuge restoration site has begun. Refuge restoration work is to be completed prior to, or on the same date as, Board acceptance of the final phase of the Pier J landfill as completed. The Board can transfer excess habitat value units to other port districts in the Southern California Bight as appropriate and with written approval of the FWS, the NMFS, and the California Department of Fish and Game. These three agencies also are responsible for habitat value assessments and tradeoff analyses associated with bank credit transfers. Transfer and use of excess habitat value units is not to result in net loss of fish and wildlife values. All MOU parties will be notified in writing by the Board of the acceptance or rejection of any proposal to transfer credits.

Monitoring and Evaluation

Physical and biological monitoring will be done after the lagoon restoration is finished in 1990.

Background

Mitigation banks in this area of California are of great interest because of plans to fill large areas of the port to create land for continued port development. Advantages to the port associated with developing mitigation in advance include current costs that are less than they will be in the future and the fact that land is scarce and new land for mitigation projects may not be available in future years. There are only a few habitat mitigation measures currently considered feasible for offsetting habitat losses associated with harbor landfills; the principal measure is to create tidally influenced and subtidal wetland and coastal embayment habitats out of low value upland habitat. Although there was little commonality among mitigation policies of the various involved agencies, a mitigation goal of no net loss of in-kind or ecologically equivalent habitat value was accepted. Selection of Anaheim Bay as the bank site was based, in part, on the existence of tidal sloughs and salt marsh with adjacent upland or diked areas that could be returned to tidal influence through excavation and improved tidal conduits and lack of biological value of the area in its prebank condition to any of the evaluation species.

Discussion

This mitigation bank has helped reduce the "open warfare" that was occurring in the area relative to compensation for port development projects and has gotten the FWS out of the reactive arena concerning this issue. The bank has resulted in habitat benefits in advance of habitat losses and in good rapport among the involved parties; the FWS generally has been pleased with the mitigation that is occurring under the banking agreement.

Sources

Anonymous. 1986. Memorandum of Understanding among the Board of Harbor Commissioners of the City of Long Beach, the California Department of Fish and Game, the National Marine Fisheries Service, and the Fish and Wildlife Service, to establish a procedure for compensation of marine habitat losses incurred by port development landfills within the Harbor District of the City of Long Beach, by marine habitat creation at Anaheim Bay. 9 pp + exhibits.

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MINNESOTA DEPARTMENT OF TRANSPORTATION WETLAND BANK

Bank Characteristics

Location: This is a Statewide mitigation bank, implemented on a State Highway District basis, with credits and debits maintained separately within each District.

Size: The size of the bank is variable; additional credit lands can be added to the bank at any time.

Development projects: Highway projects; permit and license activities.

Bank life: In perpetuity.

Banking Agreement

A technical memorandum was issued by the Minnesota Department of Transportation in January 1987. The memorandum was a legally binding document signed by the Department of Transportation, the FWS, the Federal Highway Administration, and the Minnesota Department of Natural Resources.

Interagency Team

Each of the nine Minnesota Department of Transportation districts has its own team of bank managers; the Department of Transportation-Environmental Section representative and the biologist from the Minnesota Department of Natural Resources are the same on all the management teams, while representatives from the Minnesota Department of Transportation and the FWS vary between districts. The Federal Highway Administration also has a representative on each district management team. The bank management teams are responsible for deciding which projects will be accepted as credits or debits, actual evaluation of credit and debit sites, and bank monitoring. Other local, State, or Federal agencies may become cooperators on a project-specific basis. The Minnesota Department of Transportation acts as the principal bookkeeper of the bank account and circulates transaction statements to the districts, cooperating agencies, and the Federal Highway Administration semiannually or as requested.

Bank Credit Establishment

The Minnesota Department of Transportation is responsible for carrying out habitat measures to establish bank credits. These activities are, in priority order, wetland restoration (particularly prairie potholes), enhancement of existing wetlands, and creation of wetlands out of upland borrow pit sites. Bank management plans are developed separately, with FWS input, for each credit area accepted. In most cases, credit areas are freshwater wetlands of value to migratory waterfowl and other wetland species.

Bank Land Ownership

Credit areas initially are purchased by the Minnesota Department of Transportation. Once the habitat management measures have been completed, the Department of Transportation transfers the land to the Minnesota Department of Natural Resources, which becomes responsible for long-term site management.

Evaluation Methodology

The evaluation methodology used with the bank is a modification of HEP80, which works acceptably well. Habitats are tracked by wetland type, rather than as habitat for particular species. Standard wetland habitat type suitability indices were developed for each Department of Transportation district to reduce travel time and personnel expenses associated with conducting many small HEP evaluations and to provide consistency in conducting HEP evaluations on a geographic basis.

A guilding process, based on feeding and reproductive activities, was used to select eight species (one representing each of the eight guilds) to represent each wetland type. The total score for each wetland type was divided by eight to obtain a mean value that became the standard habitat suitability index for that particular wetland type. Habitat units, used as the currency to quantify the value of wetland debit and credit areas, are determined by multiplying habitat quality, rated on a scale of 0 to 100, by habitat quantity in acres.

Most debit areas are assigned a standardized HEP value for various wetland types, as agreed to by the cooperating agencies, while credit areas are evaluated on an individual basis. The standard wetland habitat suitability indices are used both to determine habitat losses associated with individual highway projects and as a starting point in conducting the more extensive HEP evaluation of credit areas. Debits and credits originally are based on preconstruction estimates of the wetland wildlife habitat values of the involved areas. The early estimates become the final number of debits and credits unless there are appreciable design changes, in which case the final debit and credit amounts are determined by a reevaluation of impacts. When mitigation is accomplished on private land acquired by the Minnesota Department of Transportation, transfer of ownership to another public agency does not affect the final number of habitat units gained.

The portion of the wildlife habitat quality for an area that can be applied to the bank as credit depends on the anticipated longevity of the area. Credit areas in public ownership receive 100% of their HEP value, credit areas secured by easements on private land receive something less than 100% of their HEP value (depending on the length of the easement), and credit areas secured by neither title nor easement receive credits based on the number of years they are expected to remain in an enhanced or created wetland condition.

Debit and Credit Procedure

Credits to the bank can be gained through wetland creation, enhancement, or preservation. Debits to the bank result from unavoidable transportation-related wetland impacts. Bank accounts of created habitat units and habitat unit losses are maintained on a district basis. If a proposed debit area involves water protected by the Minnesota Department of Natural Resources, a Department of Natural Resources permit, in addition to the other required Federal and State permits, must be obtained before the bank can be used to offset project losses.

Any interested party can suggest possible credit areas, which are investigated by the cooperating agencies, with the appropriate Department of Transportation district making the final decision. Cost-effectiveness of developing the area as a credit site is a major factor in the district's final decision. First consideration is given to mitigation within rights-of-way owned by the Minnesota Department of Transportation, with second consideration given to mitigation contiguous to highway rights-of-way, preferably contiguous to the project in which wetland impacts are being incurred. When neither of these options exist, consideration is given to State or Federal land, private land acquisition from a willing seller, easement agreements with private landowners, lands for which neither title nor easements can be obtained, and acquisition or preservation of existing wetlands on private land where it can be demonstrated that the wetland is in real danger of destruction.

Once a credit area has been approved for inclusion in the bank, a statement is prepared that includes all the conditions that must be met in order to receive credit, the number of credits involved, and the parties responsible for all aspects of developing the area as a credit site. Bank credits can be used only for Minnesota Department of Transportation projects and are limited to compensating for losses in wetland wildlife habitat. Impacts to, or enhancement of, fisheries habitat may be handled in a similar manner on a project-specific basis, but fisheries credits cannot be used to offset wildlife debits and vice versa. Projects currently must be in the same Department of Transportation district as the area against which they are credited, although interdistrict crediting to accomplish greater mitigation of prairie potholes in western Minnesota is being considered.

Bank Activity to Date

Crediting and debiting of the bank is an ongoing procedure, with no limits on either. The objective was to maintain a credit balance in each Department of Transportation district, although only two of the districts currently have a credit balance. Meetings among the involved agencies are being held to try to resolve this situation.

Background

There were four objectives related to the establishment of this mitigation bank:

1. To facilitate compliance with Executive Order 11990, Protection of Wetlands, by providing cost-effective mitigation for unavoidable transportation-related wetland impacts while maximizing benefits to the natural environment.

2. To facilitate compliance with State statutes concerning protected waters by providing acceptable mitigation for unavoidable transportation-related impacts to wetland habitat.

3. To simplify the required interagency wetland mitigation coordination by developing a method for tracking unavoidable transportation-related wetland impacts and mitigation areas as agreed to by all agencies involved.

4. To outline a consistent scientific method for evaluating wetland impacts and mitigation projects in terms of wildlife habitat value.

Discussion

The two biggest benefits of this bank are increased restoration and enhancement of wetlands, with subsequent benefits to wildlife, and improved environmental awareness within the Minnesota Department of Transportation, including greater acceptance of scrutiny of wetland project impacts.

The major problem with the bank has been that the Department of Transportation does not give sufficient priority to establishment of credit areas, which has resulted in a debit balance in all but two of the highway districts. This problem currently is being addressed. Although establishment of the bank has eased tensions among agencies, there are still conflicts, basically because the objectives of the various agencies involved are so different.

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TENNECO LA TERRE MITIGATION BANK

Location: The bank is located southwest of New Orleans in Terrebonne Parish, Louisiana.

Size: 5,000 acres owned by Tenneco plus an adjacent 2,014 acres owned by others.

Development projects: Oil and gas exploration; permit and license activities.

Bank life: The expected life of the bank is 77 years, based on the estimated length of time before the area will become open water without management. Tenneco is committed to 25 years of active bank management. At that time, Tenneco and the involved agencies will determine the best course of action to continue to protect the ecological integrity of the bank wetlands.

Banking Agreement

A MOA was signed in January 1984 by Tenneco, the FWS, the NMFS, the Soil Conservation Service (SCS), the Louisiana Department of Natural Resources, and the Louisiana Department of Wildlife and Fisheries.

Interagency Team

The interagency team responsible for determining the habitat units and the average annual habitat units initially credited to the bank consisted of the MOA signators, with the FWS acting as chairman.

Bank Credit Establishment

A variety of management actions, designed to retard conversion of freshwater marsh into brackish marsh and open water by increasing freshwater and sediment inflow, improving water circulation, stabilizing water levels, and reducing saltwater intrusion, were required to establish the bank credits. The site has marshes and shallow open water, both of which provide habitat for adult and juvenile finfishes and shellfishes, and the area is used by estuarine and freshwater species. The bank area also provides waterfowl habitat, which results in keen competition for hunting leases, and supports a large trapping activity.

There was a marsh management plan developed jointly for the site by Tenneco and the SCS. Tenneco is responsible for carrying out the bank enhancement measures.

Bank Land Ownership

Tenneco owns the 5,000-acre bank site. The bank MOA has been modified to include credits for an additional 2,014 acres owned by other parties that are

adjacent to the bank site because this area is being benefitted by Tenneco's management actions. Tenneco is responsible for the long-term management of the bank.

Evaluation Methodology

HEP76, with no modifications, was used as the bank evaluation methodology and worked very well. HEP76 was selected over HEP80 because it appeared to offer a more rapid analysis method. Word models, instead of graphical or mathematical models, were used in determining habitat units. The NMFS requested that separate HEP analyses be conducted on wildlife elements and fishery elements, and on freshwater fishery elements and estuarine fishery elements.

The final credit totals for the 25 years of dedicated bank life are 50,433 wildlife habitat Resource Category 2 Average Annual Habitat Units (AAHU's), 12,056 wildlife habitat Resource Category 3 AAHU's, 57,770 freshwater fishery Resource Category 2 AAHU's, and 38,690 estuarine fishery Resource Category 3 AAHU's. If the bank life becomes 77 years, rather than 25 years, the totals will be adjusted to 150,333 wildlife habitat Resource Category 2 AAHU's, 37,132 wildlife habitat Resource Category 3 AAHU's, 177,931 freshwater fishery Resource Category 2 AAHU's, and 119,166 estuarine fishery Resource Category 2 AAHU's. There will be no adjustment of the available credits from these totals for the first 25 years, even if the predicted amount is not substantiated by later monitoring and evaluation activities, as protection to Tenneco for the large financial management investment (approximately $500,000) they agreed to make.

The number of credits in the Tenneco LaTerre Mitigation Bank has been renegotiated several times over the years. The original number was reduced at the beginning to 70% because Tenneco owns 70% of the area; this decision was later reversed when it was shown that the adjacent property was benefitting from Tenneco's management activities. The credits were lowered again during early negotiations by 68% (52/77) because Tenneco only guaranteed intensive management of the bank site for the first 25 years. Early estimates based on 77 years and the entire 7,014 acres were that credits would be sufficient to offset fish and wildlife impacts from nearly 500 oil and gas exploration and production projects. The reduced number of credits available to Tenneco during the first 25 years of bank life accommodated the concerns of the inter-agency group, particularly the Louisiana Department of Natural Resources, that Tenneco was receiving too many useable credits "up front." Tenneco officials expressed concern over this large reduction in credits and agreed to new totals only when assured that these totals would remain available for use even if habitat improvement related to management actions did not occur as predicted. The remaining two-thirds of the total credits (or some portion thereof) will be available to Tenneco beginning in year 26 if Tenneco agrees to continue intensive management of the bank area. Remaining credits will be recalculated after a full HEP analysis of the management area at year 25.

Debit and Credit Procedure

The HEP analysis provided a measure of the average number of credits available to Tenneco on an annual basis. Accrual of unused credits into future years is not allowed because the banking team believes that adverse impacts should be mitigated as they occur.

Bank credits can be applied as in-kind mitigation for unavoidable habitat losses within the same hydrologic unit, an area of approximately 500,000 acres of marsh. Requests by Tenneco to apply credits outside the hydrologic unit will be considered on a case-by-case basis; under no circumstances can credits be applied outside Louisiana.

Credits can be sold or traded to other permit applicants; however, acceptability of using credits to mitigate actions of other developers must be ruled on by the interagency group. Selling or trading credits to other permit applicants is considered a mechanism by which Tenneco can recoup part of its habitat protection and improvement costs.

Bank Activity to Date

Although crediting and debiting to the bank requires concurrence of all parties to the MOA, the FWS maintains the permanent record of transactions and provides other participating agencies with annual summary transaction data sheets. Less than 10% of the credits have been used to date.

Monitoring and Evaluation

A preliminary evaluation of the effectiveness of bank management actions was scheduled for 1 year following implementation. A complete evaluation was to occur after 5 years, with evaluations also scheduled 3 to 5 years after major operational or structural changes. There have been follow-up monitoring and evaluation efforts to assess the effectiveness of the bank management program in terms of whether or not the predicted fish and wildlife resource benefits actually occurred. Changes in bank operation were recommended and made on a one-time basis only, because of a period of drought in Louisiana. Additional changes can be recommended by the interagency team as needed to improve the bank program; Tenneco will implement recommended changes to the extent practicable.

Background

The Mississippi River Delta currently loses over 50 mi^2 of productive coastal marshes annually. The bank site was a homogeneous freshwater marsh dominated by maidencane until the mid-1950's. Subsidence and conversion of freshwater marshes to saltwater marshes and open water have been significant problems in the area since that time, as a result of the construction of navigation and oil exploration canals, natural subsidence, and hurricanes. A compounding factor, at least from Tenneco's perspective, is that title to mineral rights shifts to the State of Louisiana when property goes under saltwater.

Tenneco officials promoted the establishment of the bank as a mechanism to reduce the uncertainty associated with obtaining Section 10/404 permits, to obtain credit for marsh management actions taken by the company, and for integrating the concept of mitigation into future land management options to be considered by Tenneco decisionmakers. The depressed economics of the oil industry has significantly affected Tenneco's use of the bank.

Discussion

One of the earliest problems associated with implementation of the Tenneco LaTerre Mitigation Bank was that the FWS Washington Office dealt directly with Tenneco representatives without input from the affected FWS field and regional offices. This intervention made it difficult for regional FWS personnel to effectively negotiate implementation issues and polarized the relationship between Tenneco and other agency participants to the extent that bank implementation was in jeopardy before it began. From a FWS perspective, there have been continued problems in computating credits and debits and the bank has been very time-consuming and often an administrative headache.

On the positive side, mitigation is occurring routinely now that the bank has been implemented. In the past, either mitigation was not required at all or, even if the permit contained mitigation requirements, it was not known if the mitigation actually occurred or how effective it was.

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LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT MITIGATION BANK

Bank Characteristics

Location: The bank is located in Grant and LaSalle Parishes, Central Louisiana.

Size: 2,944 acres.

Development projects: Highway projects; permit and license activities.

Bank life: 50 years.

Banking Agreement

There is no formal banking agreement.

Interagency Team

Although there is no established interagency team, the FWS and other interested agencies have continued to try to make this bank work as intended.

Bank Credit Establishment

The starting date for this bank was 1982. However, no management activities have occurred to date because the land has not yet been transferred from the Louisiana Department of Transportation and Development to the Louisiana Department of Fish and Game. The bank site consists of bottomland hardwoods, and the area currently has numerous free-ranging domestic livestock. Projected management actions included stock fencing, timber management, and best management practices for forested wetlands.

Bank Land Ownership

The bank area consists of one large tract and 20 small scattered tracts, owned by the Louisiana Department of Transportation and Development. Although the land is to be turned over to Louisiana Department of Fish and Game, which will be responsible for carrying out the enhancement measures and long-term management, transfer will not occur until the land has been completely surveyed. The property is quite inaccessible and is not adjacent to any lands currently managed by the Louisiana Department of Fish and Game.

Evaluation Methodology

The FWS did a HEP76 analysis on the bank, even though the Louisiana Department of Transportation and Development insists on one-for-one mitigation for projects that involve Federal highway dollars. The HEP76 evaluation used

word models, and the results were later converted without redoing the old HEP analysis or doing a HEP80 analysis. The methodology worked acceptably well for the bank.

Of the 13 projects that have been debited to this bank, a formal HEP analysis to determine the number of AAHU debits was conducted only for the first five. A uniform system of project debiting was established for later projects by converting the number of acres eliminated by the project to AAHU losses. The FWS assumes that the habitat suitability index of the mitigation bank area and the habitat eliminated by a project are the same (0.29) and that the product of the number of acres eliminated by the project and an HSI of 0.29 will yield the AAHU's to be debited from the bank for that project. Using an HSI of 0.29 was believed to result in a very conservative estimate of the actual project loss in habitat value.

The original baseline HEP analysis conducted on the site by the FWS and the Louisiana Department of Wildlife and Fisheries in 1980 assumed that, without acquisition, 15% of the area would be cleared and converted to agriculture over the next 50 years, while the quality of the remaining wooded area would not vary. The FWS predicted that, under that scenario, the area would have a value of 794.21 AAHU's. This represents a measurement of baseline condition, to which management scenarios can be compared to determine net benefits.

Debit and Credit Procedure

There is no formal agreement on what the debit and credit procedure will be for the bank, and this has been a problem area. The Federal Highway Administration insists on mitigation only on an acre-for-acre basis for projects that involve Federal highway dollars. At one point, an agreement was close to being reached that would call for no mitigation for projects less than 2 acres, acre-for-acre mitigation for projects from 2 to 5 acres, and a HEP analysis to determine impacts for projects over 5 acres. The Louisiana Department of Transportation and Development and the FWS have acted as bankers, although they are not formally in charge of tracking transactions.

There were three possible management scenarios suggested for this bank, with the final number of credits dependent on which option was selected and implemented. The options were: (1) purchase without timber management, with a 15% preservation credit only, which would yield 64.46 AAHU's; (2) purchase with timber management, which would yield 376.03 AAHU's; or (3) purchase with both timber management and fencing, which would yield 1,050.70 AAHU's. To date, only scenario 1, involving land purchase, has occurred.

Credits cannot be sold or traded, unused credits cannot be accrued into future years, and there are no provisions to readjust the number of credits if the original prediction is not substantiated by later monitoring and evaluation.

Credits are available only for use in mitigating highway impacts to forested wetlands in Louisiana; impacts to other types of wetlands cannot be debited from this bank. Bank credits are used only for highway projects

outside of the coastal zone; there is a Louisiana State law that wetland losses in coastal areas must be mitigated within the coastal area.

Bank Activity to Date

The only credits available to date were the 64.46 credits for the "purchase only" option. Thirteen projects have been charged against the bank, with a total of 249.20 debits. This leaves a current balance of -184.74 credits. At a minimum, management of timber resources for wildlife benefits will have to be implemented to eliminate the deficit. Proper timber management could eliminate the current deficit and generate an additional 126.83 credits for use to mitigate future projects.

Monitoring and Evaluation

There is an informal "understanding" that there will be follow-up monitoring or assessment efforts to evaluate effectiveness of the management program. This is a fairly recent agreement, and follow-up evaluation cannot be done until the bank has been implemented as planned.

Background

The Louisiana Department of Transportation and Development was to purchase the land and turn it over to the Louisiana Department of Wildlife and Fisheries. One of the peculiarities with this bank is that the Louisiana Department of Wildlife and Fisheries is to implement all habitat improvement measures and manage the site to establish credits to mitigate for Louisiana Department of Transportation and Development projects. The land purchased by the Louisiana Department of Transportation and Development consisted of 1 large tract and 20 small, scattered tracts; the bank lands are quite inaccessible, not adjacent to any Louisiana Department of Wildlife and Fisheries management areas, and in a configuration that cannot be managed effectively.

The Louisiana Department of Wildlife and Fisheries refuses to take title until the land has been surveyed. The Louisiana Department of Transportation and Development is working toward this goal but surveying is still not complete. The Louisiana Department of Wildlife and Fisheries lacks the necessary funds to fence the bank area, which will result in the loss of many potential credits. The conclusion reached at an August 1987 meeting with the FWS, the Louisiana Department of Transportation and Development, and the Louisiana Department of Wildlife and Fisheries was that fencing the tracts would not be cost-effective and should no longer be discussed as a bank management option because of the disjunct nature of the tracts and the high probability that fencing would be vandalized. The group agreed that timber management should still be considered as a management option and that it should be implemented by the Louisiana Department of Wildlife and Fisheries to ensure the greatest wildlife benefit. The FWS believes that the Louisiana Department of Transportation and Development, as recipients of credits generated by the timber management efforts, should reimburse the Louisiana Department of Wildlife and Fisheries for its timber management costs; however, reimbursement was not part of the original banking agreement. Regardless of the approach that is taken to generate the needed credits, the bank cannot be

considered solvent until the Louisiana Department of Wildlife and Fisheries has made a written commitment to accept management responsibilities, including timber management, and necessary agreements between the Louisiana Department of Transportation and Development and the Louisiana Department of Wildlife and Fisheries have been formalized. There are three more outstanding highway projects that the Louisiana Department of Transportation and Development is committed to mitigate, which total an additional requirement of 42.84 AAHU's.

Discussion

Lack of a formal written commitment related to the bank and lack of a timeframe within which the bank was to be implemented have resulted in a situation where, 6 years later, the bank still has not been implemented as intended and credits are overdrawn. A number of problems associated with this banking effort have been identified:

1. The Louisiana Department of Transportation and Development mitigation policy dictates acre-for-acre mitigation for State highway projects. In general, there has been a lack of coordination and cooperation from the highway agencies.

2. There was no formal agreement concerning the evaluation methodology that would be used with the bank, and application of HEP to determine debits often is a point of controversy between the Louisiana Department of Transportation and Development and the involved environmental agencies.

3. There has been continuing disagreement between the Louisiana Department of Transportation and Development and the Louisiana Department of Wildlife and Fisheries over how the tracts will be turned over to the Department of Wildlife and Fisheries for management. Early on, the Department of Transportation and Development refused to turn the land over to the Department of Wildlife and Fisheries until the entire area had been applied to mitigation. Later, the Department of Wildlife and Fisheries refused to accept title to the land until it had been completely surveyed. At this time, the Department of Transportation and Development still holds title to the land.

4. Withdrawals have been made from the bank that were not covered by existing credits, resulting in a negative balance.

5. There was no formal agreement on the timeframe for bank implementation and, after 6 years, the bank still has not been implemented as intended.

6. Bank lands generally are small and scattered and cannot effectively be managed.

7. The Louisiana Department of Wildlife and Fisheries is responsible for implementing the bank enhancement actions and long-term management, but may lack the needed funds, while the Louisiana Department of Transportation and Development is the recipient of the credits.

8. The FWS has, and continues to, spend considerable time and effort trying to negotiate implementation of this bank, mainly because implementation was based on "gentlemen's agreements" rather than a formal document.

Steps currently are being taken to try to correct the problems and to implement an effective banking program. One possible solution is to dispose of the small land parcels, keep the large one, assign no more credits, and essentially write the bank off. Another possibility is to sell the land or exchange it for land adjacent to current Department of Wildlife and Fisheries management areas. The FWS believes that this bank can be made solvent through continued interagency cooperation and considers it a significant learning experience about the banking process.

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COMPANY SWAMP MITIGATION BANK

Bank Characteristics

Location: The bank is adjacent to the Roanoke River, near Quitsna, in the Lower Roanoke River Basin, Bertie County, North Carolina.

Size: The planned size of the bank is 1,436 acres, with 100% ownership of approximately 700 acres and a 44% interest in an additional 736 acres. As of May 1987, the bank consisted of 1,031 of the planned 1,436 acres.

Development projects: Highway projects; permit and license activities.

Bank life: The life of the bank is 30 years, with two 30-year renewable terms. However, the area will be managed in perpetuity.

Banking Agreement

A MOU was signed in September 1985 by the North Carolina Department of Transportation, the FWS, the North Carolina Wildlife Resources Commission, and the North Carolina Nature Conservancy.

Interagency Team

There is a bank evaluation team, made up of the MOU signers, responsible for determining initial credits and project impacts.

Bank Credit Establishment

The bank site consists of approximately 700 acres of selectively cut-over bottomland forest and 736 acres of climax gum-cypress forest. The majority of the tract is old growth timber of high value to fish and wildlife, although portions of the tract were selectively timbered in the past. Soils in the area support vegetation typical of wetland ecosystems and are frequently flooded. The five cover types represented are: (1) gum-cypress, dominated by baldcypress and water tupelo gum; (2) logged gum-cypress in slightly drier areas subjected to selective cutting; (3) bottomland hardwoods, located on the levee and dominated by a diverse assemblage of hardwood species; (4) logged bottomland hardwoods which have been selectively cut; and (5) transmission corridor habitat beneath a power line, dominated by herbaceous vegetation. The site supports approximately 105 species of plants, 34 species of mammals, 90 species of birds, 37 species of reptiles, 40 species of amphibians, and 60 species of fish. The area is a high quality tract with high priority for preservation as bottomland hardwood habitat.

The North Carolina Wildlife Resources Commission is responsible for carrying out the bank enhancement measures and for long-term management. The Wildlife Resources Commission will prepare a formal wildlife management plan for the bank, which will become part of the MOU when it has been finalized and concurred with by all parties. Initial management costs will be paid by the North Carolina Department of Transportation.

Bank Ownership

The North Carolina Wildlife Resources Commission has total ownership of part of the bank lands and partial interest in the rest. Funding for acquisition of the site was provided through an appropriation by the State legislature.

Evaluation Methodology

Baseline values for the bank area and debit requirements for projects larger than 5 acres were determined through the use of HEP80; mitigation for smaller projects is acre-for-acre. Four species were used (gray squirrel, mink, hairy woodpecker, and wood duck), and modifications were made in the HSI models to fit the habitat. It is too early to evaluate how well this methodology will work for the bank.

The MOU does not specify a particular HEP version; this allows greater flexibility in future evaluations, avoids having to redo project analyses done earlier with HEP76, and allows the possibility of using a more appropriate evaluation methodology in the future. Although a thorough analysis of the impacts of highway development projects on bottomland hardwood habitat would include assessments of losses in both aquatic and terrestrial functions, there was insufficient information, funding, or personnel available to determine the amount of aquatic habitat present either permanently or seasonally on the bank tract or on individual project sites. In addition, it was uncertain if any aquatic credits would result from a comparison of the future of the site with and without the bank. The evaluation team believes that mitigating the terrestrial component of the ecosystem will also protect the aquatic component, and no analysis of aquatic habitat is planned. The period selected for analysis is 90 years, based on the assumption that highways require maintenance with time but seldom are abandoned once established.

The value of the bank tract is highest for mink, slightly less for hairy woodpeckers, and lowest for gray squirrels and wood ducks. A net gain of 47,252 habitat units over the life of the bank was calculated by comparing the predicted future of the area with and without the bank and annualizing those results over the 90-year bank life. Habitat units were derived from protecting the high value of the old growth timber in the area, which would otherwise be lost to logging, with no credits derived from placing the tract in public ownership. Credits will be revised if any significant management measures are implemented and when an accurate land survey of the area has been completed and actual cover type acreages determined.

The assessment of bank credits is subject to refinement when the Wildlife Resources Commission has completed its formal wildlife management plan, oriented to the four evaluation species, and the effectiveness of this plan has been evaluated. It is unlikely that additional credits will be generated if the Wildlife Resources Commission elects to implement a passive type of management. Benefits to some species may occur and credits increase if more active measures are proposed, such as timber management.

Credits are derived by multiplying total net change in AAHU's for the four evaluation species by the duration of the analysis. Initial credits were generated only by retaining bank habitats in a forested condition through conservation; no credits were derived from placing the property in public ownership.

Debit and Credit Procedure

The credits for all evaluation species were added together to simplify the bank accounting procedure. Total credits, determined by multiplying the net AAHU's by the 90-year annualization period, were divided by the bank acreage to derive a credit-per-acre value (45.8 credits/acre) for use in debiting projects that impact less than 5 acres. The credit-per-acre value is multiplied by the acreage loss associated with the project and the bank debited accordingly. This mathematical compensation method may not result in

compensation for habitat quality losses comparable to that which would be determined through the use of a HEP analysis. However, over- or underdebiting is expected to balance out over the life of the bank.

For projects over 5 acres, a HEP study is done to determine debits. These HEP studies use the same process and evaluation species as the bank analysis and occur after completion of the final NEPA document but prior to application for Section 404 permits. The results for each evaluation species are added together before debiting the bank.

Debiting projects impacting less than 5 acres on an acre-for-acre basis while requiring a HEP analysis for larger projects was a compromise position among the MOU parties. Although the FWS and the Wildlife Resources Commission preferred to use a habitat-based methodology to determine impacts for all projects debited to the bank, regardless of size, Federal Highway Administration policy allows mitigation only up to acre-for-acre and the North Carolina Department of Transportation also prefers debiting on that basis. MOU parties were in agreement that conducting HEP evaluations on all highway projects that impact forested wetlands would likely require an inordinate amount of staff time. The Wildlife Resources Commission and the FWS agreed to acre-for-acre compensation for small projects with the realization that when HEP analyses on larger projects indicate the need for greater than acre-for-acre debiting, there will be mitigation costs to the North Carolina Department of Transportation beyond those reimbursed by the Federal Highway Administration.

Credits are available for use in offsetting project losses only when the impacts have a duration equal to, or less than, the life of the bank. The 90-year timeframe will be used for new highway construction or new alignments and for widening projects within or adjacent to existing rights-of-way, based on the assumption that project losses will be essentially permanent. For project losses of shorter duration, such as construction of haul roads and temporary detours at bridge replacement sites, the duration used to determine project impacts will be adjusted to reflect only the period of time the habitat is physically absent plus the amount of time required to restore baseline habitat values.

Use of credits is restricted to mitigation of only one, broadly defined habitat type: bottomland hardwood habitat (palustrine forested wetlands). All forested wetland ecosystems that receive periodic flooding from adjacent water courses are covered, while forested wetlands occurring as pocosins or Carolina Bays are not eligible for mitigation using the bank. The Department of Transportation wanted the bank to be applicable to project impacts throughout the State; the FWS and the Wildlife Resources Commission wanted use of credits limited geographically so that habitat loss could be addressed within a definable unit, such as a coastal province. The compromise position was to define eligible habitat for use of credits in such a manner that the losses mitigated would occur predominantly within the Piedmont and Coastal Plain.

Double debiting is required for habitat losses resulting from projects within the bank site, and credits can be neither sold nor traded.

Monitoring and Evaluation

Monitoring activities are specified in the MOU and also can be conducted when special circumstances warrant or as additional funding and personnel become available. A preliminary assessment of management plan effectiveness is scheduled after 5 years, and a complete analysis is scheduled after 10 years. There are no provisions to readjust credits if the predicted number is not substantiated by later monitoring and evaluation activities.

Bank Activity to Date

At least seven projects under 5 acres have been applied against bank credits, while several larger projects that require a HEP analysis are being held pending final determination of credits available from the bank.

Background

There has been a tremendous loss of bottomland hardwood forests in the Southeast since about 1960; North Carolina is one of the States that continues to lose its forested wetlands at an alarming rate. The strongest development pressures contributing to the loss are forestry and agriculture, while losses to bridge and highway construction also have a major cumulative impact.

It has frequently proven difficult to condition Federal permits issued to the North Carolina Department of Transportation with mitigation measures. Highway projects generally are perceived by the COE as being in the public interest and requiring little or no mitigation. In addition, it is difficult to obtain and enforce adequate onsite mitigation conditions. Extensive highway development activities in North Carolina are resulting in significant losses of productive palustrine forested wetlands. In many cases, offsite mitigation appears to be the only viable compensation alternative. The FWS and the Wildlife Resources Commission were willing to participate in an experimental mitigation bank because of the difficulties in offsetting the impacts of highway projects.

The North Carolina Department of Transportation began to seriously consider a bank in early 1985 as a possible means to facilitate construction of a new bridge on U.S. 13-17 across the Roanoke River in Williamston, North Carolina. The North Carolina Nature Conservancy had acquired interest or options in several tracts with significant natural resource value along the Roanoke River that the Wildlife Resources Commission wanted to obtain and manage. The Department of Transportation offered to provide the necessary funds for the purchase of a portion of one of those tracts (the Company Swamp Tract), which could then be conveyed to the Wildlife Resources Commission.

The Company Swamp Tract was considered one of the best remaining hardwood sites on private land in North Carolina and had top priority for protection from development. The area contains excellent inland waterfowl habitat and supports sizeable wild turkey and deer populations. At the time the bank was established, the tract was in imminent danger of clearcutting and conversion to forestry monoculture.

Discussion

The two most positive aspects about the bank are that a quality bottomland hardwood site was protected that otherwise would have been lost to timbering activities and that mitigation is now being obtained for projects for which there would be no mitigation otherwise.

Problems associated with the bank include the public perception and concern that the North Carolina Department of Transportation is "buying permits" and not really being required to mitigate for project-related unavoidable impacts and that having the bank in place may cause the FWS and other involved natural resource agencies to, at least subconsciously, stop earlier in their efforts to ensure the fewest possible unavoidable impacts. Neither the COE nor the EPA would participate in the banking agreement, which also contributed to public skepticism. Their reluctance revolved around concerns that protecting an existing wetland does not really offset the future destruction of other wetlands because the end result is a net loss in wetland habitat. The EPA also felt that speculation about future clearcutting should not be the basis for establishing credits.

Despite concerns, the Department of Transportation and the EPA did not try to block implementation of the bank. FWS objectives for the bank have remained to provide an opportunity to recoup the unavoidable losses that have occurred in the past and to reduce the number of project-by-project negotiations that result in mitigation areas too small to be realistically managed for fish and wildlife resources.

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GOOSE CREEK MITIGATION BANK

Bank Characteristics

Location: The bank is located on Goose Creek, which is a tributary of the west branch of the Elizabeth River, in Chesapeake, Virginia.

Size: 11 acres.

Development projects: Highway projects; permit and license activities.

Bank life: The bank is "dedicated" until the credits are used; however, the bank should remain as tidal wetlands under the ownership of the Virginia Department of Highways and Transportation in perpetuity.

Banking Agreement

The bank was implemented during 1982-1984. It is uncertain if there was a formal agreement.

Bank Credit Establishment

There was no formal bank management plan, although there was agreement that the area would be reestablished as a tidal wetland by the Virginia Department of Transportation. Habitat measures to establish credits included excavating and grading an existing borrow pit, excavating a tidal flow channel between the borrow pit and Goose Creek, and planting indigenous species of wetland vegetation. The bank, once implemented, became tidal coastal saltmarsh. The Department of Transportation used the material excavated from the borrow pit for roadway fill.

Bank Land Ownership

The bank land is owned by the Highway Agency, Virginia Department of Transportation.

Evaluation Methodology

The evaluation methodology involved acre-for-acre compensation, based on the number of acres of tidal wetlands re-created with emergent vegetation as a tidal marsh. This methodology worked well.

Debit and Credit Procedure

Bank credits are only available to offset small highway projects that affect saltmarsh wetlands in the Suffolk District. Approximately 0.55 of the bank acres were used as mitigation for the wetland impacts of five highway improvement projects in the Tidewater area. Wetlands that cannot feasibly be replaced near the project location generally can be mitigated by subtracting an equal area from the bank until the credits have been used.

The Virginia Department of Transportation acts as banker, although the FWS monitors bank transactions. Credits cannot be sold or traded to other permit applicants.

Bank Activity to Date

About 50% of the bank credits have been used. The remaining credits are expected to last another 4 or 5 years.

Monitoring and Evaluation

The Department of Transportation objective has been to get the maximum number of tidal wetland acres possible out of the bank. Although the FWS wanted to do follow-up monitoring and assessments of the success of the bank habitat improvement measures, it has not had the resources to do so. In 1982, the Virginia Institute of Marine Science expressed an interest in long-term monitoring of the bank site as a developing marsh system and wildlife habitat. However, the Institute did not get the anticipated funding, and monitoring plans were greatly reduced.

Background

The FWS had concerns that the area involved was too small to be effectively managed as a mitigation bank; time has shown that the bank is functional and manageable at 11 acres. There is a possibility that the existing bank land may be expanded by developing adjacent lands already owned by the Virginia Department of Transportation as additional credit areas.

Discussion

The Goose Creek Mitigation Bank has provided an example for the Virginia Department of Transportation that they can do something positive for the fish and wildlife resource and benefit from it at the same time. The Department of Transportation had been reluctant to agree to restore tidal wetlands in the past.

On the negative side, the design of the bank site was not as ideal as hoped for; the bank looks obviously manmade rather than like a natural area. Some of the FWS design recommendations to make the area look more natural were accepted, while others were rejected because of their cost. There has been a problem with obtaining complete vegetative establishment at the bank, and it is unclear if the problem will remedy itself over time or if the Department of Transportation will need to replant unvegetated areas or take some other remedial action.

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NORTH DAKOTA STATE HIGHWAY DEPARTMENT MITIGATION BANK

Bank Characteristics

Location: Replacement theoretically can be anywhere in the State but, practically, it is limited to areas north and east of the Missouri River.

Size: There is no fixed size to this bank. Bank credits are added as opportunities arise and debits are made project-by-project.

Development projects: Highway projects; permit and license activities.

Bank life: In perpetuity.

Banking Agreement

An MOU was signed by the FWS and the North Dakota State Highway Department in August 1975.

Interagency Team

The two MOU signers act as an overview team for the bank.

Bank Credit Establishment

The North Dakota State Highway Department is responsible for carrying out bank enhancement measures to establish credits, which include creating wetlands, impounding wetlands, restoring drained wetlands, and developing subimpoundments. Bank areas consist of wetlands with grassland buffers. Cropland received into the bank is converted into grassland.

Bank Land Ownership

The original owner of bank lands is the State Highway Department. Once the State Highway Department has completed wetland development and grass seeding activities, title to the land is turned over to the FWS refuge system for management. At least some of the highway easements involved are adjacent to existing refuges. In some cases, areas retained by the State Highway Department but managed by the FWS or the North Dakota Department of Game and Fish may be eligible for credit.

Evaluation Methodology

A list of replacement options was developed using consensus professional judgment. Replacement options were ranked in priority order and ratios developed for each option. Some wetland types were favored over others, and wetlands received much more weight than uplands. The final list of options was in order of decreasing desirability based on both type and location of replacement lands. Restoring drained wetlands is the most desirable option, and adjacent to the project is the most desirable location.

Debit and Credit Procedure

The FWS and the North Dakota State Highway Department both keep a running total of credit and debit transactions, with differences reconciled every year or two. There is no fixed number of credits, and the State Highway Department purposely maintains a fairly large credit balance. Use of credits is restricted to replacement of easement wetlands impacted by highway construction.

Through the end of 1985, the bank consisted of 11 tracts of land received in fee title. The tracts ranged in size from 4.59 to 160 acres and totaled 261 acres of tame grass (including former cropland), 121 acres of native grasslands, 99 acres of existing wetlands, 3 acres of impounded wetlands, 19 acres of excavated wetlands, and 7 acres of restored drained wetlands. Replacement wetland habitats included constructed wetlands (both excavated and impounded), existing natural wetlands, and restored drained wetlands.

Although easement replacement has largely consisted of discrete units of combined upland and wetland habitat that is purchased by the State Highway Department and then transferred to the FWS in fee title, there have been three special cases. These special cases, two of which were developments on National Wildlife Refuges and the third a Waterfowl Production Area, utilized highway embankments and openings for water control structures. Credits were given in one of these cases for using highway facilities and right-of-way for a marsh development project that the FWS proposed and constructed. The other two special cases involved onsite development by a construction agency in return for a right-of-way through a FWS fee-owned area. Rights-of-way through wetland easements can be granted under the provisions of the National Wildlife Refuge System Administration Act of 1966.

Bank Activity to Date

The North Dakota State Highway Department has intentionally maintained a credit balance. Through 1985, bank debits consisted of 114.71 acres of easement wetlands on 13 highway projects, including temporary, seasonal, semipermanent, and permanent pothole wetlands in a distribution similar to their natural occurrence. The highway project with the greatest impact was construction of a segment of U.S. 2, which accounted for over 50% of the total acreage mitigated by the bank. Over two-thirds of the acres predicted to be impacted by this project were seasonal wetlands, with the rest distributed between temporary, semipermanent, and permanent wetlands.

Monitoring and Evaluation

The MOU does not require monitoring and evaluation of this bank. However, contract research on the wildlife value of constructed ponds in North Dakota has supported their use as functional replacement habitats, as indicated by the level of waterfowl use of these areas.

Background

Both the FWS and the North Dakota State Highway Department have been interested for a number of years in finding an easily implementable replacement method for highway project losses that would save time and money and meet both agencies' objectives and legal requirements. The goal was to provide a mechanism for the functional replacement of direct losses of easement wetlands and, at the same time, maintain flexibility as to method, type of land rights employed, and replacement area location. With the combination of an extensive grid of highways, a large number of highway projects, and over 10,000 widely dispersed wetland easement contracts in the State, numerous interactions are unavoidable.

In 1975, an MOU was developed between the FWS and the State Highway Department that established a basis for replacing easement wetlands impacted by highway construction projects. Development of the MOU coincided with increased activity by the FWS and private conservation groups in the review and coordination of Federal Aid highway projects in North Dakota.

Discussion

The FWS believes that the North Dakota mitigation banking arrangement has been very successful in accomplishing easement wetland protection. The bank has operated without significant problems and has contributed to improved working relationships between the FWS and the North Dakota State Highway Department. The banking arrangement has continued to go smoothly, even when there have been problems in the State with other wetland issues. The Governor of North Dakota must approve bank-related deed transfers and has continued to do so through three different administrations.

FWS fee title ownership of manageable units that contain a combination of upland and wetland areas has the potential for greater benefits to fish and wildlife resources because there is more control of land use and the opportunity for more intensive management and better protection of developed wetlands from erosion. The average land replacement ratio has been about 3 acres of fee title land for each acre of lost easement wetland, which compares favorably with other habitat-based systems presently in use in the State. The State Highway Department has continued to maintain a large credit balance, and deferring some losses over a period of years is beneficial to fish and wildlife.

On the negative side, some of the lower priority habitat options have been frequently exercised. Replacement habitat type is, to some extent at least, limited by feasibility, which is not always associated with the most desirable option. As a result, restored drained wetlands and constructed wetlands have not been available as much as desired. A second problem is that excavated wetlands are not always constructed to specification because of lack of supervision, changes in borrow requirements, or the availability and use of a different borrow site.

Although it appears unlikely that highway projects with potential for major wetland impacts will be proposed in North Dakota for at least the next

few years, continued use of the banking agreement will facilitate project coordination related to future upgrades of existing highways and minor alignment changes.

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BONNEVILLE MITIGATION BANK

Bank Characteristics

Location: The bank is related to the Bonneville Unit of the Central Utah Project and is located in Wasatch and Duchense Counties, Utah.

Bank size: The bank is approximately 9,500 acres in fee title and 318 acres of wildlife easement on the Smith Homeplace.

Development projects: This bank was implemented in conjunction with the Fish and Wildlife Coordination Act, rather than a Section 404 permit, and involved a Bureau of Reclamation water development project.

Bank life: The dedicated life of the bank was until the credits were exhausted.

Banking Agreement

Although there was some correspondence involved, implementation and administration of the bank were primarily based on a "gentlemen's agreement".

Interagency Team

The Interagency Biological Review Team for the Central Utah Project worked on the bank as part of its overall project responsibilities. Each person on the Team functioned as an independent biologist, rather than an agency spokesman, although results of the biological evaluations required later agency approval. Team members were from the FWS, the Bureau of Reclamation, the Forest Service, the Water Conservancy District, and the Utah Division of Wildlife Resources.

Bank Credit Establishment

The bank mainly involved acquisition credits, rather than credits derived from habitat enhancement measures. The site had been a sheep ranch prior to acquisition. The sheep were removed with the expectation that the area would improve as deer intermediate winter range. A bank management plan was developed, although not until after bank credits were exhausted. No conceptual overall regional management concept was specifically identified. However, the site is adjacent to other desirable lands, and acquisition probably did fit into overall management goals for that general area. Bank habitat types included sagebrush, aspen, woodland, conifer forest, and pinyon-juniper forest.

Bank Land Ownership

Funding for land acquisition was supplied by the Bureau of Reclamation. Final transfer of the land to the Utah Division of Wildlife Resources was contingent on development of an acceptable management plan. A clause in the deed states that the land will revert to the Federal Government if the Division of Wildlife Resources does not use it as intended. The Bureau of Reclamation and Division of Wildlife Resources are responsible for long-term bank management.

Evaluation Methodology

The original evaluation was done in 1965 and involved information about hunter use, harvest, and vegetative cover types. The situation changed over time, and many evaluations with more habitat-related methodologies (but not HEP) were done.

Debit and Credit Procedure

The banker in charge of tracking transactions was the Interagency Biological Review Team, specifically the Bureau of Reclamation, with FWS approval. The area was acquired as deer intermediate winter range, and credits were expressed as habitat units. In some cases, land lost to projects had higher habitat value than did bank lands, at least for deer and probably also for some nongame species. This disparity in value was taken into consideration when debiting the bank.

Credits were intended for use within the transmountain diversion projects, but some out-of-basin mitigation was done. There also was some out-of-kind mitigation done with the bank; e.g., fisherman access was accepted as mitigation for big game habitat loss based on the belief that credit was due for the preservation and management of riparian areas. There was considerable give and take associated with debiting and crediting in order to accomplish an overall desirable mitigation package. Since the bank was acquired as deer intermediate winter range, flexibility was limited as far as mitigation for other species was concerned.

Bank Activity to Date

All of the credits have been used.

Background

In 1978, the recommendation was made that mitigation for the majority of habitat and wildlife losses resulting from the Strawberry Aquaduct and Collection System, Bonneville Unit, Central Utah Project, could best be done through acquisition of private land with present or potential biological value. Three advantages were associated with the change in ownership from private to public:

1. It would preserve existing wildlife habitat values on all designated land tracts and surrounding public lands by preventing the imminent development of summer homes.

2. It would provide free public access for consumptive and non-comsumptive uses. The majority of the land designated as the bank site was previously closed to the public.

3. It would allow the Utah Division of Wildlife Resources and the Forest Service to improve the wildlife habitat value on the designated parcels through management of livestock grazing and the development of watering sites, resulting in increased carrying capacity for both resident and migrant species.

The Bureau of Reclamation acquired 32,784 acres in fee title and 317.6 acres of easements from Mrs. Emory C. Smith to mitigate wildlife losses from the Strawberry Collection System. In mid-1983, the Bureau of Reclamation transferred the title to over 13,000 acres of the fee title lands located north of U.S. 40 to the Division of Wildlife Resources to mitigate for collection system losses. The wildlife easement lands also are located north of the highway. Approximately 9,500 acres of fee lands south of the highway were "banked" as the Bonneville Mitigation Bank.

Discussion

The Bonneville Mitigation Bank was a productive and ingenious effort, and it is unusual that the agencies involved supported such an effort. Interagency cooperation was significant, especially because most of the agencies had to absorb costs associated with the banking effort. One of the advantages of this bank was that mitigation was in place long before many of the project impacts occurred. Lack of a formal agreement was not a problem.

One of the negative aspects was that acquisition initially was made to meet a specific species goal (i.e., deer intermediate winter range), which limited flexibility to mitigate the needs of other species. One of the reasons this occurred was because there was a willing seller with a large piece of land the Division of Wildlife Resources wanted to acquire. It may be that other criteria would have been more desirable in terms of allowing more flexibility and avoiding the situation where a bank is tied to a single species. In some cases, the bank was used as mitigation for losses of critical deer winter range or fawning or summer range, all of which are more limiting than is intermediate winter range. There were concerns that the bank involved out-of-basin and out-of-kind mitigation, both from the perspective that an

undesirable precedent would be set and because out-of-basin mitigation might make it difficult to mitigate in the immediate vicinity of future impacts. Even with these concerns, the bank successfully involved mitigation for a very complex project and was a more desirable option than accepting the Central Utah Project with unmitigated losses.

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SUMMARY OF BANK EFFECTIVENESS

The FWS has been involved in 13 implemented mitigation banks since the early 1980's, with several more currently at various stages of planning and negotiation. Although some of the 13 banks have not yet been implemented long enough to evaluate effectiveness, experience with the majority can be used to compare actual banking activities with expected advantages and disadvantages and to make recommendations designed to contribute to successful bank implementation in the future. This study focused on implementation success of banks with FWS involvement and did not attempt to make a systematic assessment of the biological impact of the mitigation techniques associated with the banks. Information presented below on bank effectiveness is based on discussions with the FWS contact for each of the banks.

Consolidation of Small Mitigation Projects

Several implemented banks had consolidation of mitigation for small wetland losses as an objective. This objective is based on the likelihood that development projects for which the bank is established are otherwise unlikely to involve mitigation for lost habitat values or the economies of one large mitigation project versus several smaller efforts. The likelihood that no project-related mitigation will occur without the bank is especially relevant to highway projects. It frequently is difficult to get Federal permits for highway projects conditioned with mitigation measures, especially when these projects are determined by the COE to be in the public interest.

Both the Company Swamp and Goose Creek Mitigation Banks have successfully involved mitigation for a number of different highway projects, for impacts to bottomland hardwood habitats and to saltmarsh wetlands, respectively. Consolidation of highway mitigation projects at one site is a less apparent goal for banks that involve an indeterminant number of sites of no fixed size. For example, credit areas are added to the North Dakota State Highway Department Mitigation Bank as the opportunity arises. By the end of 1985, the bank consisted of 11 tracts of land, the smallest of which was only 4.5 acres. Bank debits through 1985 averaged just under 4 acres per project.

In the case of the Minnesota Department of Transportation Wetland Bank, the possibility of consolidation of mitigation for highway project impacts at one site is uncertain. Although credit areas can be added to the bank at any time with no minimal limit to their size, bank units currently have a debit balance in all but two of the State Department of Transportation districts. The Louisiana Department of Transportation and Development Mitigation Bank has yet to be implemented as intended but currently consists of one large and 20 small scattered tracts, which will certainly limit the number of projects that can be debited per tract.

Two of the five banks established to offset losses from port and harbor development projects, the Astoria Airport Mitigation Bank and the Port of Long Beach-Pier A, Newport Bay Mitigation Bank, clearly involve consolidation of mitigation projects. The Port of Los Angeles-PacTex, Batiquitos Lagoon Mitigation Bank and the Port of Long Beach-Pier J, Anaheim Bay Mitigation Bank, on the other hand, originally were established primarily to mitigate a single project, with any excess credits available for use for other projects. The fifth port and harbor bank, the Port of Los Angeles-Inner Harbor, Cabrillo Marina Mitigation Bank, balances water surface area in the harbor created through excavation or removal of existing fill with areas lost to fill projects.

Each of the other three mitigation banks involves consolidation of mitigation efforts: the Tenneco LaTerre Mitigation Bank for oil and gas exploration undertaken by the Tenneco Corporation; the Bonneville Mitigation Bank for various activities associated with the Central Utah Bureau of Reclamation water development project; and the Bracut Wetland Mitigation Marsh for losses of small (no more than 2 acres) pocket marshes in Eureka, California.

Advance Mitigation

Mitigation actions occur in advance of project impacts when bank credits are established prior to debiting activities. There are at least two administrative techniques used to ensure that mitigation is in place prior to project impacts:

1. An evaluation occurs after bank management activities have been implemented to determine whether or not anticipated increases in habitat value were generated. Credits are adjusted accordingly prior to bank debiting.

2. No debiting beyond the existing credit level is allowed.

Although several banks have succeeded in achieving mitigation in advance, other banks have had problems in this area. For example, the Minnesota Department of Transportation Wetland Bank and the Louisiana Department of Transportation and Development Mitigation Bank currently have negative balances. Mitigation is not occurring in advance with these banks, and there is no assurance that sufficient credit areas will be added in the future to offset existing debits. In the Louisiana bank, no management activities have occurred to date, and the only credits have been those associated with the purchase and preservation of existing habitat. After 6 years, the bank still has not been implemented as intended, and there is no formal agreement about the debiting and crediting procedure. Thirteen projects have been debited to the bank; total debits for those projects greatly exceeded available preservation credits and have resulted in a large negative balance.

Addition of credit areas and project debiting can occur any time with the Minnesota bank. There has been more emphasis on project debiting than on bank crediting, and there currently are negative balances in all but two of the State Department of Transportation district bank units. The North Dakota State Highway Department Mitigation Bank is similar, in that credit areas are added as opportunities arise and debits are made on a project-by-project basis. Mitigation in advance is occurring with this bank because the State Department of Transportation purposely maintains a fairly large positive bank balance.

In some cases, such as the Port of Long Beach-Pier J, Anaheim Bay Mitigation Bank, at least part of the bank management activities and project development occur concurrently. However, construction work on Seal Beach National Wildlife Refuge, which constituted the credits, was to be completed prior to or on the same date as the Harbor Board accepted the final phase of the Pier J landfill as complete. The bank is not completely implemented, even though the formal agreement was signed in early 1986. If excess credits are generated during Refuge construction work, they can be used for future port development landfill projects.

Management activities occurred before project debiting in the Bracut Wetland Mitigation Marsh but, because of problems associated with soil conditions in the former lumberyard, it was not possible to predict the success of the mitigation project in terms of production and habitat quality. Six years passed before changes in bank lands were evaluated and it was determined that the bank had not provided the hoped-for increase in habitat values; meanwhile, some debiting had occurred.

The Port of Los Angeles-Inner Harbor, Cabrillo Marina Mitigation Bank involves mitigation in advance in a unique way. Bank credits were established by computing net change in water surface area retroactive to June 1975, when the Section 404 permit program started. The formal banking agreement was signed in October 1984.

Changes in the Planning Effort

Mitigation banking has the potential to affect the quality of project planning in either a positive or negative manner. On the positive side, at

least three of the banks have resulted in increased benefits for wetlands either because mitigation is now being received in situations where it was not occurring before or because other developers are proposing banks after one has been established in their area. The presence of a bank should not affect efforts to limit project impacts to unavoidable losses, but it can increase the speed and likelihood that mitigation for such unavoidable losses occurs.

Half of the implemented banks have resulted in better integrated resource planning efforts among State and Federal agencies and private parties, at least to some extent. The same number of banks have helped minimize time and money spent by developers in planning projects that subsequently require modification to mitigate impacts.

Potential negative effects of an existing bank on the quality of project planning include using the bank as a substitute for adequate planning to avoid or reduce impacts to fish and wildlife resources, developers perceiving the bank as a mechanism to ensure blanket approval of future permit applications, a reduction in the quality of project planning in terms of looking for the least damaging alternative and on-site mitigation possibilities, or a reduction in the rigor with which the Section 404(b)(1) guidance compliance reviews are made.

None of the implemented banks appear to have been used to reduce the rigor of Section 404(b)(1) reviews or as a substitute for adequate planning to avoid or reduce impacts to fish and wildlife resources. However, developers associated with some of the banks have tried to argue that once the required mitigation is completed at the bank site, their future project activities should not be scrutinized too closely. Some developers have attempted to use banks as mechanisms to ensure blanket approval of future permit applications. These perceptions can have a negative impact on a developer's willingness to commit to quality project planning in terms of identifying and selecting the least damaging alternative and onsite mitigation possibilities. Both resource agency vigilance and, at least in some west coast States, strong State laws, help prevent problems in obtaining adequate project planning under these circumstances.

Conflict Resolution

About a third of the banks have helped reduce conflicts among the permit applicants, the commenting agencies, and the permitting agencies over fish and wildlife considerations. Formal banking agreements can ease tensions and improve working relationships among agencies. However, some disagreements and conflicts will exist as long as the objectives of the various agencies and developers in a banking effort are so different. About the same number of banks have helped reduce conflicts by promoting mitigation as something that should be integrated into an overall land management scheme and as a cost of doing business for developers. Over half the banks have provided a mechanism whereby resolution of mitigation issues can be resolved in advance of the time constraints of the permit review period.

Permit Processing Procedure

Having a mitigation bank in place has shortened the length of time it takes to obtain a permit with 4 of the 13 banks. In most cases, the efficiency with which FWS Ecological Services personnel can review and comment on permit applications has increased because mitigation plans do not have to be developed for each individual project, and mitigation planning is done for larger areas. Over half the banks have reduced uncertainty associated with obtaining permits for applicants, even though projects proposed as bank debits are not automatically accepted as such.

Public Recognition for Developers

Developers have used publicity about established banks to obtain public recognition for their wetland actions in many cases. Such activities have not occurred to any appreciable extent for banks where there have been implementation problems.

Personnel Resources Required for Bank Implementation

FWS personnel time associated with bank implementation has ranged from 0.5 person-months to 24 person-months, depending on the size and complexity of the effort and Service involvement once the bank has been established. At least five banks have required between 1 and 2 person-years of effort. FWS time spent was worth it in terms of what was gained from a mitigation perspective for at least seven of the banks, with some banks not yet far enough along in their implementation to make this determination. Half the banks have resulted in a greater benefit-per-acre-per-dollar-spent than would have been obtained if each project was mitigated separately. Even though FWS time may not have been considered worth it directly from a mitigation perspective for a few banks, involvement with these banks has had value as a learning experience.

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APPENDIX A. MITIGATION BANKS WITH U.S. FISH AND WILDLIFE SERVICE INVOLVEMENT

IMPLEMENTED BANKS

REGION 1

Oregon

Astoria Airport Mitigation Bank
Contact: Marvin Yoshinaka
U.S. Fish and Wildlife Service
727 N.E. 24th Avenue
Portland, OR 97232
FTS: 429-6179

California

Port of Long Beach - Pier J, Anaheim Bay Mitiagion Bank
Contact: Jack Fancher
U.S. Fish and Wildife Service
Federal Building
24000 Avila Road
Laguna Niguel, CA 92656
FTS: 796-4270

Port of Long Beach - Pier A, Newport Bay Mitigation Bank
Contact: Jack Fancher
U.S. Fish and Wildife Service
Federal Building
24000 Avila Road
Laguna Niguel, CA 92656
FTS: 796-4270

Port of Los Angeles - PacTex, Batiquitos Lagoon Mitigation Bank
Contact: Jack Fancher
U.S. Fish and Wildife Service
Federal Building
24000 Avila Road
Laguna Niguel, CA 92656
FTS: 796-4270

Port of Los Angeles - Inner Harbor, Cabrillo Marina Mitigation Bank
Contact: Jack Fancher
U.S. Fish and Wildife Service
Federal Building
24000 Avila Road
Laguna Niguel, CA 92656
FTS: 796-4270

Bracut Marsh Mitigation Bank
Contact: Mike Long
U.S. Fish and Wildlife Service
2800 Cottage Way, Room E-1803
Sacramento, CA 95825
FTS: 460-4613

REGION 3

Minnesota

Minnesota Department of Transportation Wetland Bank
Contact: Jim Leach
U.S. Fish and Wildlife Service
Park Square Ct., Suite 50
400 Sibley Street
St. Paul, MN 55101
FTS: 777-3131

REGION 4

North Carolina

Company Swamp Mitigation Bank
Contact: "Mike" Gantt
U.S. Fish and Wildlife Service
P.O. Box 25039
310 New Bern Avenue
Raleigh, NC 27611-5039
FTS: 672-4520

Louisiana

Louisiana Department of Transportation and Development (LDOTD)
Mitigation Bank
Contact: Terry Slattery
U.S. Fish and Wildlife Service
P.O. Box 4305
Lafayette, LA 70502
FTS: 687-6630

Tenneco LaTerre Mitigation Bank
Contact: Dave Soileau
U.S. Fish and Wildlife Service
P.O. Box 4305
Lafayette, LA 70502
FTS: 687-6630

REGION 5

Virginia

Goose Creek Mitigation Bank
Contact: Bob Zepp
U.S. Fish and Wildlife Service
1825B Virginia Street
Annapolis, MD 21401
302-269-5448

REGION 6

North Dakota

North Dakota State Highway Department Mitigation Bank
Contact: Vic Hall
U.S. Fish and Wildlife Service
1500 Capitol Avenue
Bismarck, ND 58501
FTS: 783-4481

Utah

Bonneville Mitigation Bank
Contact: Clark Johnson
U.S. Fish and Wildlife Service
2060 Administration Building
1745 W. 1700 South
Salt Lake City, UT 84104-5110
FTS: 588-5649

POTENTIAL BANKS

REGION 1

Oregon

Svenson Island Mitigation Bank
Contact: Marvin Yoshinaka
U.S. Fish and Wildlife Service
727 N.E. 24th Avenue
Portland, OR 92732
FTS: 429-6179

California (The formal agreement for this bank was signed 29 January 1988; no physical work on the bank is expected for several months.)

Irvine Company - San Joaquin Marsh Mitigation Bank
Contact: Jack Fancher
U.S. Fish and Wildlife Service
Federal Building
24000 Avila Road
Laguna Niguel, CA 92656
FTS: 796-4270

Humboldt Bay Wetland Mitigation Bank
Contact: Peggy Kohl
U.S. Fish and Wildlife Service
2800 Cottage Way, Room E-1803
Sacramento, CA 95825
FTS: 460-4613

Idaho

Idaho Department of Transportation Mitigation Bank

Contact: Vicki Saabs Marks
U.S. Fish and Wildlife Service
4696 Overland Road, Room 576
Boise, ID 83705
FTS: 554-1931

REGION 2

New Mexico

Middle Rio Grande Operations and Maintenance (O&M) Project Migitation Bank
Contact: Dean Watkins
U.S. Fish and Wildlife Service
P.O. Box 1306
Albuqerque, NM 87103
FTS: 474-2914

REGION 3

Illinois

Illinois Department of Transportation Mitigation Bank
Contact: Tom Groutage
U.S. Fish and Wildlife Service
Rural Route 3, Box 328
Marion, IL 62959
FTS: 958-6659

Carlyle Lake Mitigation Bank
Contact: Bruce Stebbings
U.S. Fish and Wildlife Service
Rural Route 3, Box 328
Marion, IL 62959
FTS: 958-6659

REGION 4

Florida

Pennsuco Everglades - Bird Drive Everglades Basin Mitigation Bank
Contact: Joe Carroll
U.S. Fish and Wildlife Service
P.O. Box 2676
Vero Beach, FL 32960
305-562-3909

South Carolina

L-Reactor Mitigation Bank
Contact: Roger L. Banks
U.S. Fish and Wildlife Service
P.O. Box 12559
217 Fort Johnson Road
Charleston, SC 29412
FTS: 677-4707

REGION 5

Virginia

Virginia Department of Transportation Mitigation Bank
Contact: Bob Zepp
U.S. Fish and Wildlife Service
1825B Virginia Street
Annapolis, MD 21401
301-269-5448

REGION 7

Alaska

Creamer's Refuge Banking Area
Contact: Jim Nolke
U.S. Fish and Wildlife Service
101 12th Avenue, Federal Bldg., Box 20
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907-456-0203

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This report presents the results of an evaluation designed to (1) compile a current inventory of implemented mitigation banks with FWS involvement; and (2) based on an analysis of those banks and other input, provide guidance for use in developing and implementing mitigation banking proposals. The report consists of three parts: a discussion of the concept and process of mitigation banking, a description of the legislative and policy background, and an overview of mitigation banks with FWS involvement.

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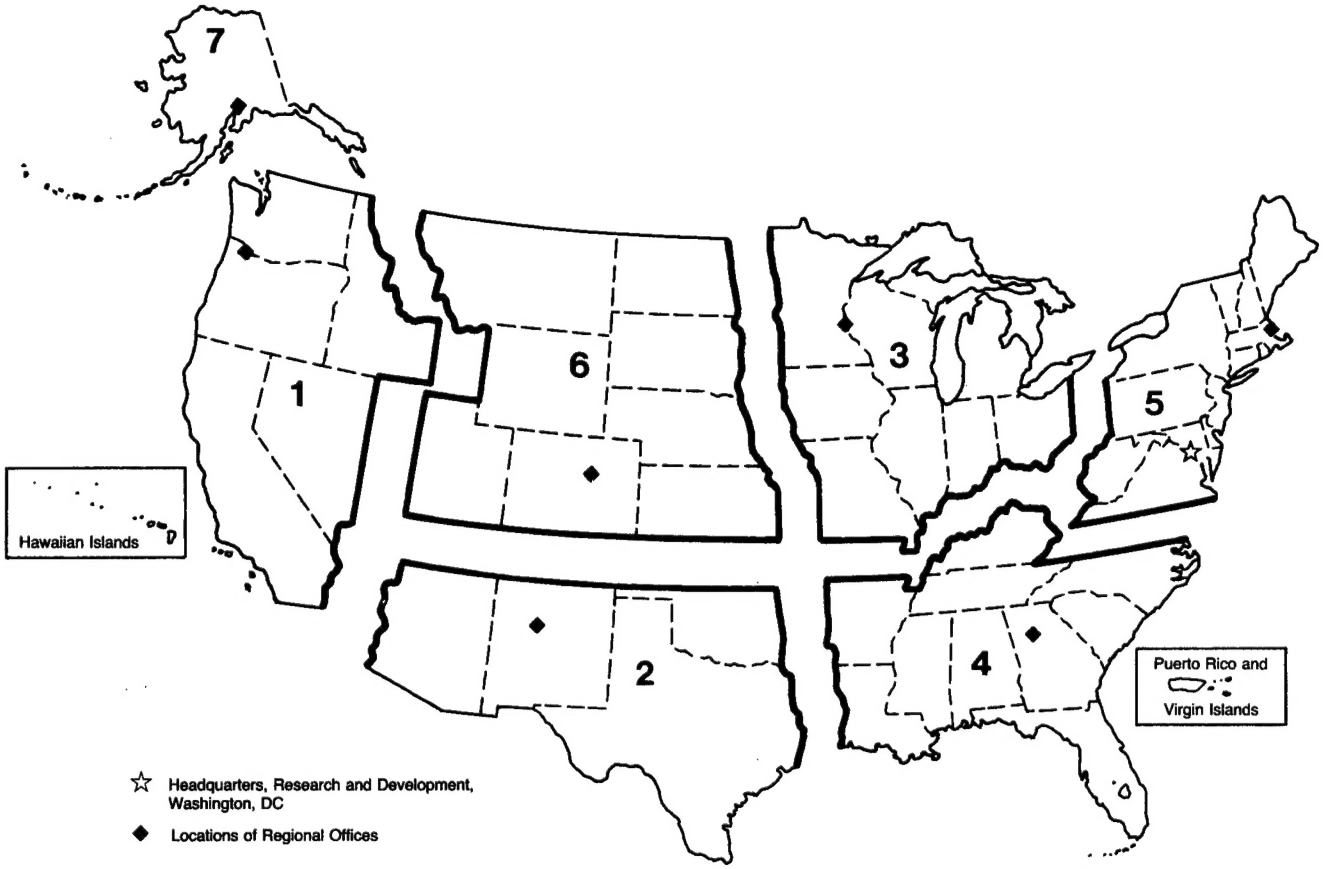

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Albuquerque, New Mexico 87103

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75 Spring Street, S.W.
Atlanta, Georgia 30303

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Regional Director
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Regional Director
U.S. Fish and Wildlife Service
P.O. Box 25486
Denver Federal Center
Denver, Colorado 80225

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U.S. Fish and Wildlife Service
1011 E. Tudor Road
Anchorage, Alaska 99503

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